

The Futurist

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Best regards,

[/u/dream-hunter](#)

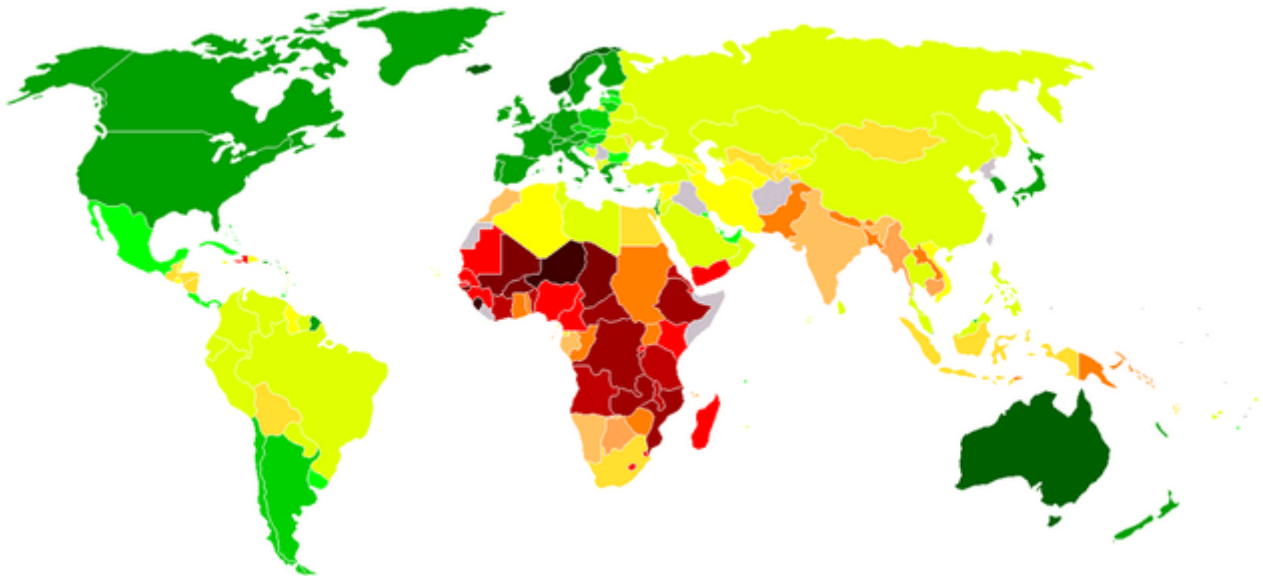
Founder of TheRedArchive
July 29, 2026

UN Human Development Index

The Futurist · 24 January 2006 · Archived copy · Original

The UN publishes an annual report on human development each year, which produces a composite score for almost all nations in the world, based on indicators like per capita income, life expectancy, literacy, higher education, diffusion of technology, patents generated, etc.

The world map below displays the approximate development level of the world's nations, with the greener nations being more developed, and the redder nations being less developed (source : Wikipedia).



Wealth and poverty can be measured in both relative and absolute terms. In absolute terms, the progress in human development that has been made since 1975 is stunning. See the table of Human Development Index progress [here](#).

In 1975, only about 20 nations had achieved a score of 0.800 or greater (the level that corresponds to being a 'developed' country). By 2003, approximately 57 countries have achieved 'developed' status.

This can be linked entirely to the diffusion of technology, spread of globalization, and the emergence of the United States as the dominant economic model in the world, creating win-win trade arrangements with many other countries.

Welcome to The Futurist

The Futurist · 24 January 2006 · Archived copy · Original

Welcome to this new addition to the blogging universe, The Futurist, on this day of January 24, 2006.

The goal of The Futurist is to analyze current trends to make future predictions, specifically more complex predictions that require the convergence of multiple trends. These tend to be the predictions that most others get wrong, as they are only projecting one trend forward, with no accounting of multi-trend convergence.

There are two co-bloggers here, one with a more technological bent, and the other with a more political (an Independent who leans right) bent. We will not distinguish between the two of us, in terms of who posted what, and which person is commenting. Among many experiments, one will be if two different minds can create a unified, superior output.

We may alternatively comment as 'The Futurist' or as 'Genghis Khan', abbreviated as 'GK' (an inside nickname here).

Thank you, and may we produce content that you find compelling.

Scientific Breakthrough will help Speed up Flu Drug Development

The Futurist · 25 January 2006 · Archived copy · Original

As important as terrorism is, Al-Qaeda has still managed to kill no more than 10,000 people worldwide in the past five years. An outbreak of bird flu, however, could kill tens of millions. The [Spanish Flu outbreak of 1918](#) killed 50 million people, or nearly 3% of the world's population at the time. If a pandemic of similar severity were to engulf the world today, it would spread much more quickly in this age of international air travel, and could wipe out most of the population of developing countries in the world, as well as cause an economic calamity more severe than the Great Depression.

However, scientists have now [discovered how the deadly H5N1 bird flu virus replicates inside cells](#). While the virus will continue to mutate and attempt to outpace our efforts to develop effective drugs quickly, what is noteworthy is how far our technology has advanced. As recently as 1995, it would have taken several years to map the genome of a flu virus and dig out this information. Now, the same can be achieved in a matter of months, due to computers being 100 times more powerful than they were in 1996, and the productivity of this exponential improvement in computational power now diffusing pervasively throughout our scientific research infrastructure.

In the future, new pathogens will be decoded in even shorter times, hopefully at a rate faster than they can mutate.

China's Economy grew 9.9% in 2005

The Futurist · 25 January 2006 · Archived copy · Original

China was once again the fastest-growing large country in the world, with **9.9% growth in 2005** on top of 10.1% growth in 2004.

This incredible surge, which began in 1979 or 1991, depending on how you look at it, has lifted over 400 million Chinese out of poverty, helped China rise greatly in **almost all measures of human development**, and kept the world economy growing at a higher rate than that of the United States. At the current rate, China will become a developed country (a country with a Human Development Index score greater than 0.800) by 2010, putting China roughly at the level of human development the United States had in 1960.

However, I also submit that China will have to evolve into a genuine democracy to advance their society beyond that level in the decade following 2010. I submit that to truly become a wealthy nation, China will have to foster innovation, creativity, and self-determination at the grassroots level, and cannot achieve this as long as the Chinese Communist Party controls Chinese society this tightly.

A bit of perspective is in order.

Consider that America is still condemned heavily for slavery that ended in the 1860s (sometimes even from countries that had slavery until well past that period), yet China is criticized relatively less than that for their invasion of Tibet during the 1950s and their Tiananmen Square massacre of 1989, just 17 years ago.

Consider that when there is a tsunami in the Indian Ocean or an earthquake in Pakistan, America is criticized for not providing enough aid soon enough. Few voices are even asking the supposedly emerging superpower on the same continent for aid.

America is criticized for not providing enough humanitarian aid to Africa, despite the billions already provided. How often do you hear anyone suggest that China should also donate aid to Africa?

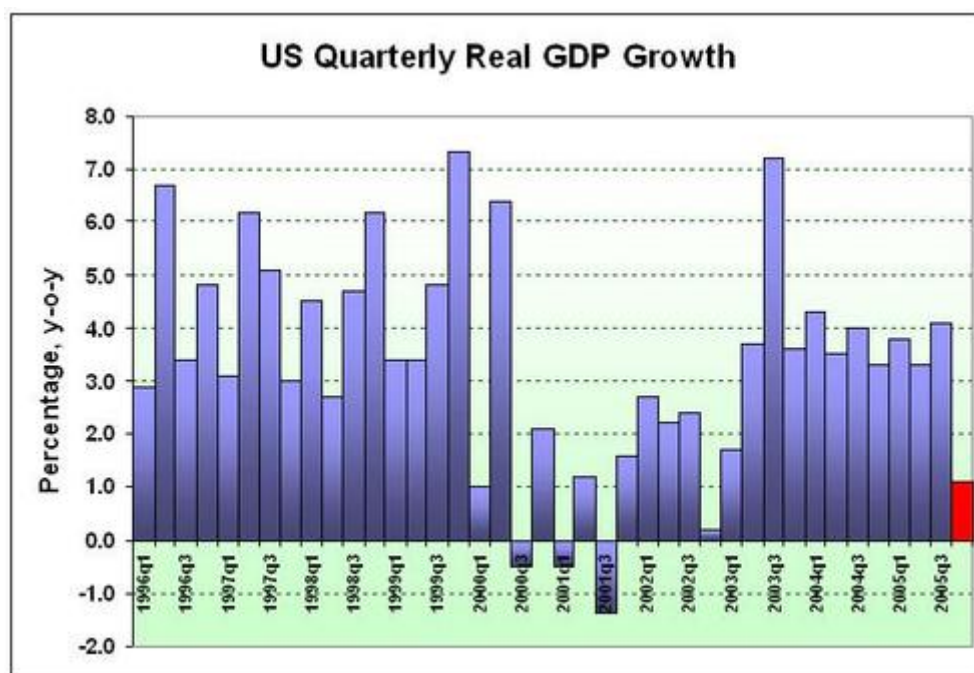
As the world's lone superpower, America carries a heavy burden. Being held to a standard that no other country is held to, and being criticized for solving only a few, rather than all of the problems in the world, is something Americans have grown accustomed to. Those who are so quick to conclude that China will achieve parity with or even surpass America have to consider just how many burdens China has to be prepared to carry before it can occupy the same echelon.

US GDP Grew at 1.1% in Q405

The Futurist · 27 January 2006 · Archived copy · Original

The US economy posted a growth rate of 1.1% in the final quarter of 2005, substantially below expectations of 3.0%. While this is the lowest growth rate in the last 12 quarters, it is still above the levels where fears of a recession become legitimate. The economic disruptions caused by Hurricane Katrina and high oil prices shaved off the majority of fourth-quarter growth, and the first quarter of 2006 may very well be higher than average in order to revert back to the economy's mean trendline.

Here is a chart of the quarterly GDP growth rates for the US economy for the last 10 years, with the red quarter being the most recent one. The current interruption does seem out of place within the solid growth trend we were on up till this point.



Prediction : The US economy will grow at greater than 3% in 2006, even as oil remains above \$50/barrel. We will have adapted to the new reality, and will be permanently able to withstand oil prices as high as \$70/barrel without a problem.

The Technological Progression of Video Games

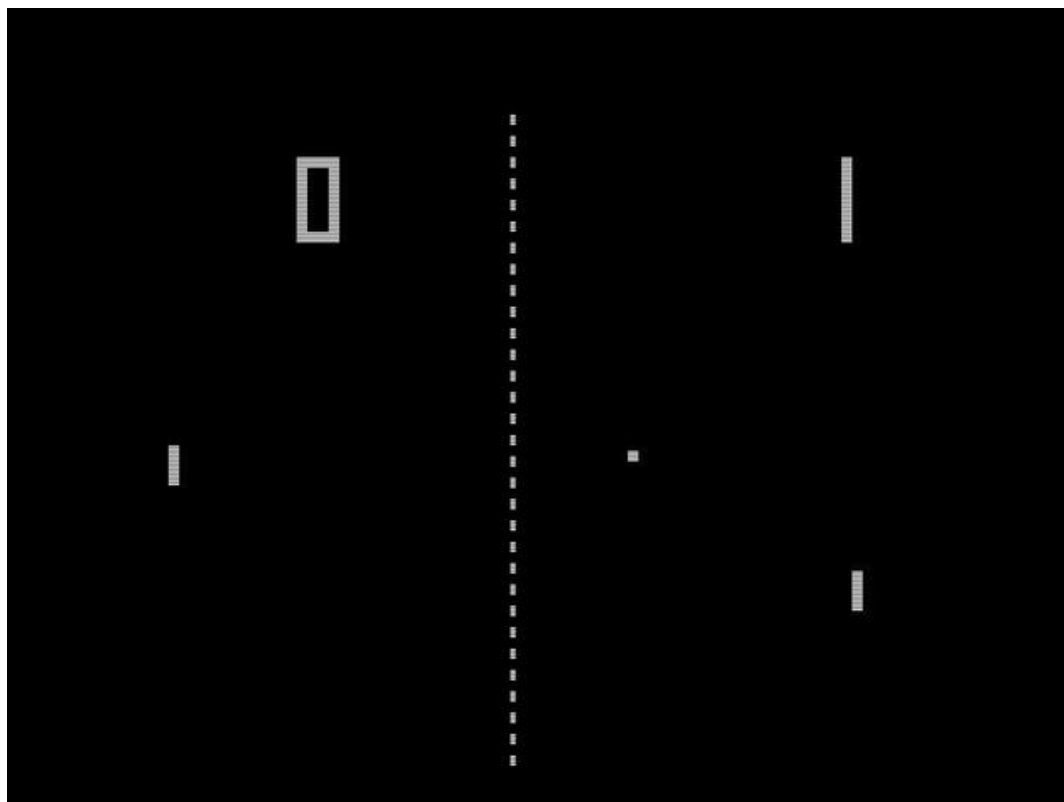
The Futurist · 28 January 2006 · Archived copy · Original

As several streams of technological progress, such as semiconductors, storage, and Internet bandwidth continue to grow exponentially, doubling every 12 to 24 months, one subset of this exponential progress that offers a compelling visual narrative is the evolution of video games.

Video games evolve in graphical sophistication as a direct consequence of Moore's Law. A doubling in the number of graphical polygons per square inch every 18 months would translate to an improvement of 100X after 10 years, 10,000X after 20 years, and 1,000,000X after 30 years, both in resolution and in number of possible colors.

Sometimes, pictures are worth thousands of words :

1976 :



1986 :



1996 :



2006 :



Now, extrapolating this trajectory of exponential progress, what will games bring us in 2010? or 2016?

I actually predict that video games will become so realistic and immersive that they will displace other forms of entertainment, such as television. Details on this to follow.

The future will be fun...

Related : [The Next Big Thing in Entertainment](#)

Why do the biggest technological changes take almost everyone by surprise?

The Futurist · 28 January 2006 · Archived copy · Original

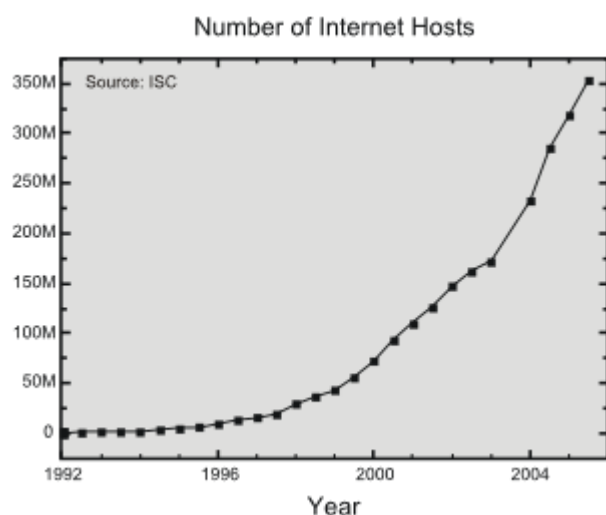
The Internet was born as early as 1969, but no later than 1983, depending on what you consider to be the event most analogous to a 'birth'. However, only a tiny fraction of the world's people were aware of the Internet even in the early 1990s. Then, by 1994-95, the graphical browser from Netscape seemingly emerged from nowhere, opening up a wonderland that appeared to have the sum total of human knowledge instantly available to anyone with a computer.

This 'World Wide Web' was predicted by almost no one in the late 1980s and was absent from the vast majority of science fiction work depicting the late 1990s onwards, just five years before it happened (with the notable exception of Ray Kurzweil in his book "The Age of Intelligent Machines"). So many supposed 'great thinkers' missed it. How?

Because, while they could easily extrapolate exponential trends such as [Moore's Law](#) and the dropping cost of telephone calls/data transfer, almost no one thought about the bigger vision - combining the two.

- 1) By the late 1980s, personal computers were starting to make their way to the mass market. That most of the population might have bought their first PC by 1995 was an easy prediction.
- 2) Long-distance telephone rates were dropping through the full 20-year period from 1970 to 1990. That this would continue until costs would be virtually zero was an easy prediction. Plus, people already had modems and were exchanging data between computers in the 1980s.

But combining the two, for the grand vision of hundreds of millions of PCs collectively accessing and contributing to the growing World Wide Web of information, was the missing layer of analysis that almost every great thinker missed.



Notice how the number of internet hosts was already growing exponentially in the early 1990s, but the apparent 'knee of the curve' occurred after 1996.

So, the next question becomes : *How do we make additional predictions by noticing multiple, steady exponential trends, and knowing which ones will combine into something explosive, at what time?*

That is, of course, the \$64 trillion question. I will venture a few, however, in the coming weeks. Stay tuned.....

Related : [Mili, Micro, Nano, Pico](#)

Related : [The Next Big Thing in Entertainment](#)

When Worlds (and Centuries) Collide :

The Futurist · 31 January 2006 · Archived copy · Original

An article from [Winds of Change](#) :

A cartoon from [Cox and Forkum](#) :



Is this fair criticism, or unfair stereotyping? How offended should Muslims be about the above cartoon? If they are offended, what constitutes an appropriate protest? Are people afraid to say what they really think, which is even more revealing?

India's Economy grew at 7.5% last year

The Futurist · 31 January 2006 · Archived copy · Original

India's economy is now the second-fastest growing of any large country in the world, albeit still much slower than **the 9.9% that China recorded in 2005**. What is interesting is how quickly the mainstream media went from having a blind spot on India to speaking of it in the same sentence as China.

As recently as 1998, most of the mainstream press was spoke of China as an emerging superpower, while India was still spoken of merely in the context of its nuclear tests, rivalry with Pakistan and its poverty. Most articles spoke of India and Pakistan under a suggestion that they were equals.

Now, almost all articles about China being a rising economic superpower also include India. India has, in just eight short years, changed its entire 'brand' from being one of austere poverty and an intractable, stalemated dispute with Pakistan, to being one of the two rising superpowers in this world, a place with an endless supply of knowledge workers promises to reshape the global economy.

That there are even articles like **this**, which compare India and China to see which has more promise, is telling. Such comparisons were nearly unheard of in the late 1990s.

What has enabled a country as large as India to revamp its entire 'brand', its perception in the eyes of the world, so completely, in such a short time?

I attribute this to four factors :

- 1) The rise of Internet usage and bandwidth speeds, permitting more business collaboration between India and the United States.
- 2) The War on Terror, where a stable, thriving democracy, containing 150 million Muslims, is seen as a model and positive influence on nascent democracies in Afghanistan and Iraq, thus receiving indirect moral support from the US, UK, and Japan.
- 3) The Indian community in the US reaching critical mass. Their numbers have **more than doubled from 1990 to 2000**, and continue to grow. They are also the **highest-income ethnic group in the US**, and are developing many business ventures between the US and India.
- 4) The gradual, ongoing replacement of older generation Indians with a new generation that is globally aware, tech-savvy, better educated, less xenophobic, and has higher self-esteem. Older generation Indians kept India under socialist stagnation for decades, and kept Indian society at a lower level of Maslow's hierarchy for far too long. They were, frankly, an embarrassment in many aspects of human existence, and their passing on can only lead to massive progress.

Prediction : India becomes the foremost economic and political 'fad' of 2006, with at least five cover stories on India in major magazines, in 2006.

Why \$70/barrel Oil is Good for America

The Futurist · 1 February 2006 · Archived copy · Original

After President Bush's SOTU address last night, his Energy Initiative may not be what gets the mainstream excited. After all, every President since Nixon has announced a desire to free America from dependence on foreign oil, and while there have been tiny steps of progress towards this, it has taken so long that few will believe that it will be any different this time.

However, I will come out and say that the next 10 years will, in fact, be different. Here's why.

When oil spiked in 1973 after the Yom Kippur War to a price that would be the equivalent of \$90/barrel today, this caused a world-wide recession, including a very deep recession in the US. Most of the US economy was still dependent on manufacturing, with information technology being a miniscule sector.

However, at \$67/barrel today, we are only seeing a slight economic slowdown, and even if prices were to rise to \$90/barrel today, we still would not dip into recession through that alone, as the US economy has evolved to the extent of being only about one-third as intrinsically bound to oil consumption as 32 years ago.

The US economy produces 2.5 times as much economic output per barrel of oil, as in 1973.

We are already evolving towards making our vulnerability to oil prices an asymptotically dwindling problem. This is accelerating as advances in information technology accelerate. This is why **world economic growth is accelerating at ever-increasing speeds**.

High oil prices today are not triggering one solution to the problem, but many. At a sustained \$70/barrel, numerous alternatives, like ethanol, Canadian tar sands, Colorado oil shale, solar power, etc. become much closer to cost-competitiveness. They were not options in 1973.

In addition, this market force has caused the stagnant innovation we have seen in automobile technology during the era of cheap gasoline to awake from its slumber. The real story behind all the buzz behind hybrid vehicles is that the cost delta between a hybrid and traditional vehicle is now under 15% of the vehicle's price, and dropping. In about 10 years, the term 'hybrid' will not exist at all, as that technology will merely be a standard feature in all cars.

Credit goes to President Bush for increasing funding for basic research in energy technology. While this will not deliver benefits during his remaining time in office, it will bring us large dividends by 2015.

Prediction : Despite several scares in the next 2-4 years, by 2015, oil prices will not worry people nearly as much anymore, whatever the price of oil at the time. A much smaller portion of the US economy will be tied to oil prices. This new reality will be visible in many places, such as the typical 2015-model family car yielding 60 MPG (highway) despite having a 240 hp engine.

Gas at \$4/gallon is not so bad, if you only need 5 gallons a week.

Turn that frown upside down. :)

The Coming Jump in Energy Technology Advancement

The Futurist · 2 February 2006 · Archived copy · Original

Some people say ethanol is the answer. Others say solar. Still others say wind, while yet others say that more sophisticated technology in the car itself and big light-emitting-diodes in the home can reduce oil consumption to the point that it doesn't matter.

Will any one of them revolutionize the world in ten years? Probably not.

The point is, there is not just one thing being worked on to kill the monster of US oil dependency, but many. The monster will be killed by a thousand cuts.

An [article on Winds of Change](#) about the 8 possible alternative energy technologies.

An [article in Fortune](#) about ethanol.

Many people are pessimistic, after the lack of progress over the last 30+ years. However, the amount of energy-related murmurs in the blogosphere is trending higher, and the number of public and private energy initiatives, including venture capital going to energy, is much higher than even a couple of years ago.

There is a more than fair chance that the cocktail of accelerating, exponential innovation, market forces, and renewed political interest in energy innovation is building a head of steam. I have commented recently on [why \\$70 oil is good for America](#).

I'm convinced that the world of 2015 will have had substantial jumps in energy technology from where we are today, not the least of which will be the typical 2015-model middle-class family sedan offering 60 mpg despite having a 240 hp engine.

It is always darkest before the dawn..

The End of Rabbit Ears, a Billion more Broadband users

The Futurist · 4 February 2006 · Archived copy · Original

On Feb 17, 2009, television signals will no longer **be broadcast through the airwaves**. A rabbit-ear antenna will not bring television to a set, and to say 'on the air' will be obsolete.

So why do we care about this?

While this will not affect the majority of households that are already subscribing to cable television, this will usher in a substantial wave of technological innovation. The freed up band of the electromagnetic spectrum has certain scientific properties that can be exploited to transmit new generations of wireless broadband.

Imagine getting a 100 Mbps signal on your cell phone, fast enough to download streaming high-definition video. Your cellphone service would include this broadband, and you could even link the phone as an adapter to your home network, and receive this broadband into your network. This would allow you to consolidate your broadband and cellphone service into one subscription, saving money.

More importantly, the innovations that arise through this will induce leapfrogging to broadband in the developing world.

The scalability of wireless broadband will result in Internet access spreading to previously disenfranchised markets. In India, the wired infrastructure is so poor that 99.9% of the population does not have broadband Internet access today, and 90% of households do not have landline telephones. But cellphone penetration has already overtaken landlines, at 80 million subscribers and growing rapidly.

Cellphones become the natural vehicle of leapfrogging to broadband deliverence to areas where landline telephones and wired broadband have no chance of reaching in the near future. This diffusion will be shockingly rapid.

Prediction : By 2013, Asia and Latin America will jointly have 900 million people exclusively subscribing to wireless broadband services through cellphone-like devices, enjoying speeds of 5 Mbps or more. 80% of these people have no Internet access, not even dial-up, today.

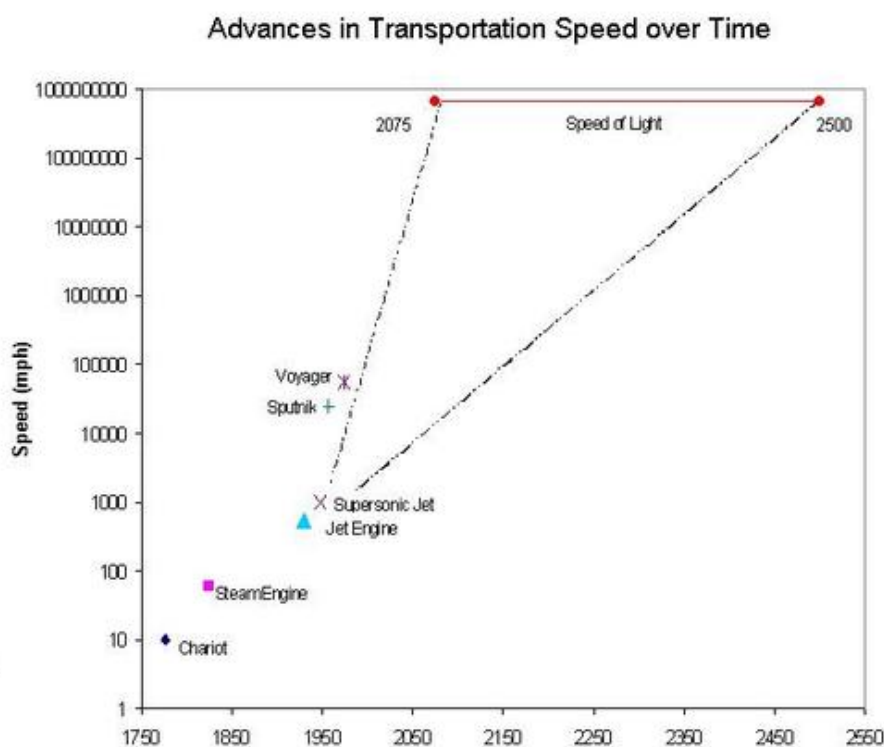
Exponential, Accelerating Growth in Transportation Speed

The Futurist · 7 February 2006 · Archived copy · Original

In the modern world, few people truly understand that the world is progressing at an *exponential* and *accelerating* rate. This is the most critical and fundamental aspect of making any attempt to understand and predict the future. Without a deep appreciation for this, no predictions of the intermediate and distant future are credible.

Read [Ray Kurzweil's essay on this topic](#) for an introduction.

Among the many examples of accelerating progress, one of the easiest to historically track and grasp is the rate of advancement in transportation technology. Consider the chart below :



For thousands of years, humans could move at no more than the pace of a horse. Then, the knee of the curve occurred, with the invention of the steam engine locomotive in the early 19th century, enabling sustained speeds of 60 mph or more. After that came the automobile, airplane, and supersonic jet. By 1957, humans had launched an unmanned vehicle into space, achieving escape velocity of 25,000 mph. In 1977, the Voyager 1 and 2 spacecraft were launched on an interplanetary mission, reaching peak speeds of 55,000 mph. However, in the 29 years since, we have not launched a vehicle that has exceeded this speed.

Given these datapoints, what trajectory of progress can we extrapolate for the future? Will we ever reach the speed of light, and if so, under what circumstances?

Depending on how you project the trendline, the speed of light may be reached by Earth-derived life-forms anywhere between 2075 and 2500. How would this be possible?

Certainly, achieving the speed of light would be extremely difficult, just like a journey to the Moon might have appeared extremely difficult to the Wright brothers. However, after the 1000-fold increase in maximum speed achieved during the 20th century, a mere repeat of the same magnitude of improvement would get us there.

But what of various limits on the human body, Einstein's Theory of Relativity, the amount of energy needed to propel a vehicle at this speed, or a host of other unforeseen problems that could arise if we get closer to light-speed

transportation? Well, why assume that the trip will be made by humans in their current form at all?

Many top futurists believe that the accelerating rate of change will become human-surpassing by the mid-21st century, in an event known as the **Singularity**. Among other things, this predicts a merger between biology and technology, to the extent that a human's 'software' can be downloaded and backed up outside of his 'hardware'.

Such a human mind could be stored in a tiny computer that would not require air or water, and might be smaller than a grain of sand. This would remove many of the perceived limitations on light-speed travel, and may in fact be precisely the path we are on.

I will explain this in much more detail in the near future. In the meantime, [read more about why this is possible](#).

Elevators into Space - Yes, Really.

The Futurist · 16 February 2006 · Archived copy · Original

Most popular science fiction is still not all that ambitious in what it expects the audience to accept. The basics, such as assumptions that space will be explored by large spaceships, and that faster-than-light travel will be achieved before human near-immortality, are given. Yet, neither is a probable outcome within current trends of technological progress, and thus represent an unwillingness to challenge many basic assumptions about our technology and existence.

Reality can be far more exotic than the science fiction of earlier generations, because not only are the wrong trends extrapolated in science fiction, but linear, rather than exponential, thinking is applied.

People are **working to build a functioning space elevator by 2018** - just 12 years from now. It would consist of a carbon nanotube ribbon that extends into space to carry 100 tons up at a time, to a height of at least 65 miles or higher. NASA has a long-term goal of extending an elevator all the way up to 62,000 miles in height, or one-fourth of the distance to the Moon.

Beyond absurd, you say?

Material strength, at least, is not going to be a problem. **Carbon Nanotubes** can form superstrong materials that can be strong enough and light enough to handle this. Nanotubes were priced at \$230,000 per pound in 2000, but the price is dropping exponentially, and even a 65-mile ribbon would not be tremendously expensive by 2018.

My opinion on whether this goal is possible? It is difficult, and 2018 might be a decade too soon, even if it does succeed. But a voyage to the Moon would have appeared difficult to Thomas Jefferson, and the accelerating rate of progress continues to shorten the interval between major innovations. They already advanced from 300m to 1600m in just a few months. What if they got to, say, 10 miles by 2016? Would people take notice?

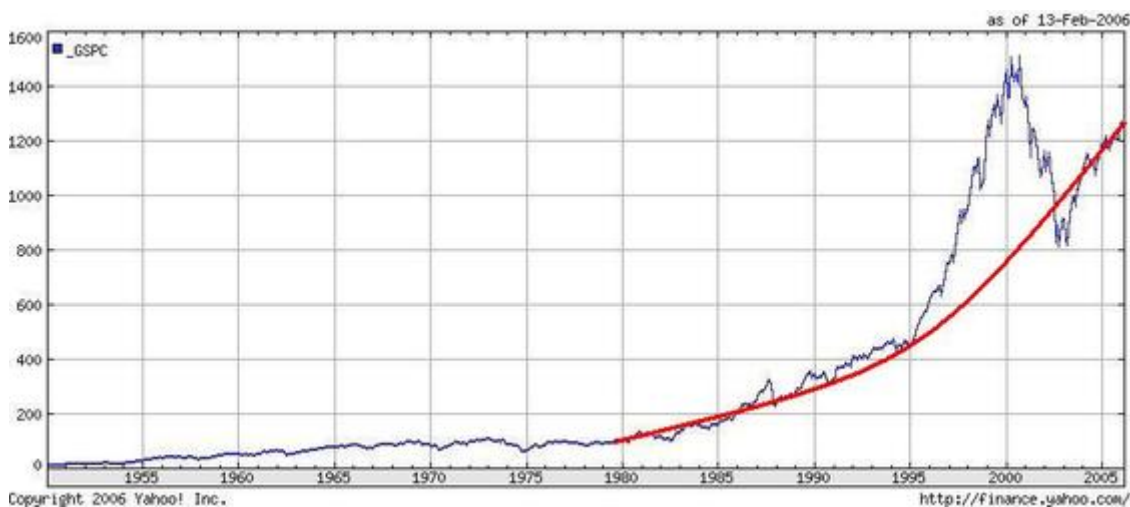
This will be a fun one to watch over the next few years. Stay tuned for updates.

The Stock Market is Exponentially Accelerating too

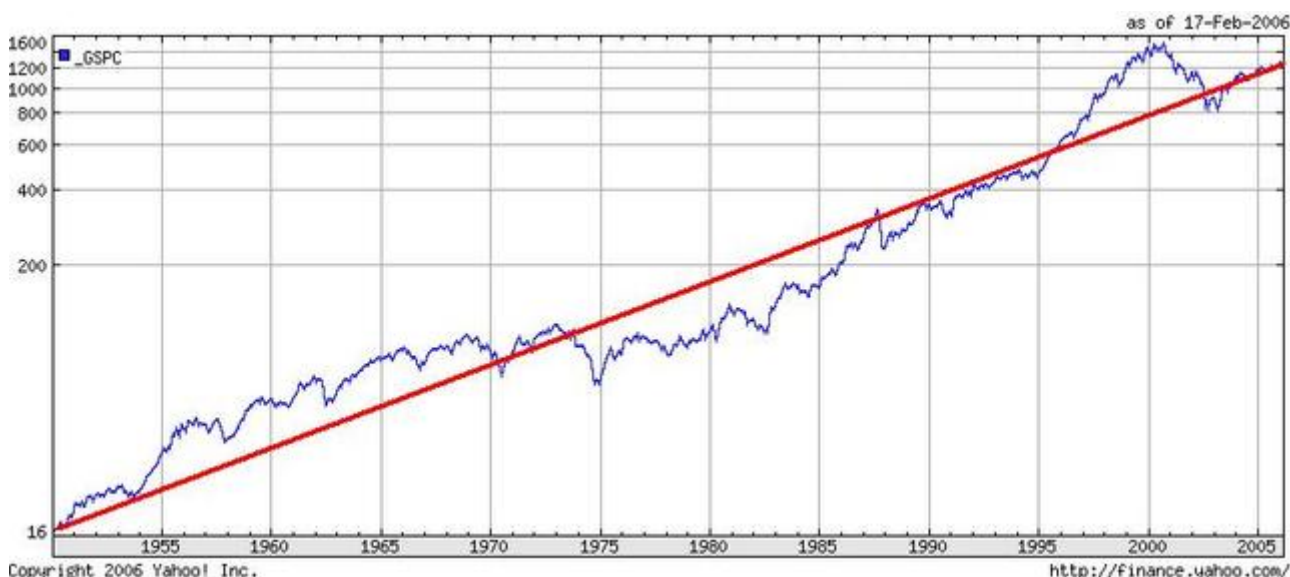
The Futurist · 16 February 2006 · Archived copy · Original

Many still have significant doubts about my [article on how economic growth is growing at an accelerating pace](#). To this, I offer the basic evidence that the world economy comfortably grows at more than 4% per year, and this rate was unheard of in any part of human history prior to the second half of the 20th century, because if such growth existed from, say, the Roman Era, then the compounding over 2000 years would make everyone alive today a billionaire.

Another place in which to judge the rate of exponential growth is the stock market. Below is a chart of the S&P500 index from 1950 to today. I have added the red trendline to show how the market is moving in quite a predictable, exponential trajectory. The economic malaise of the 1970s, the bubble of the late 1990s, and the bust of 2001-02 all negated each other to invariably move back to the trendline.



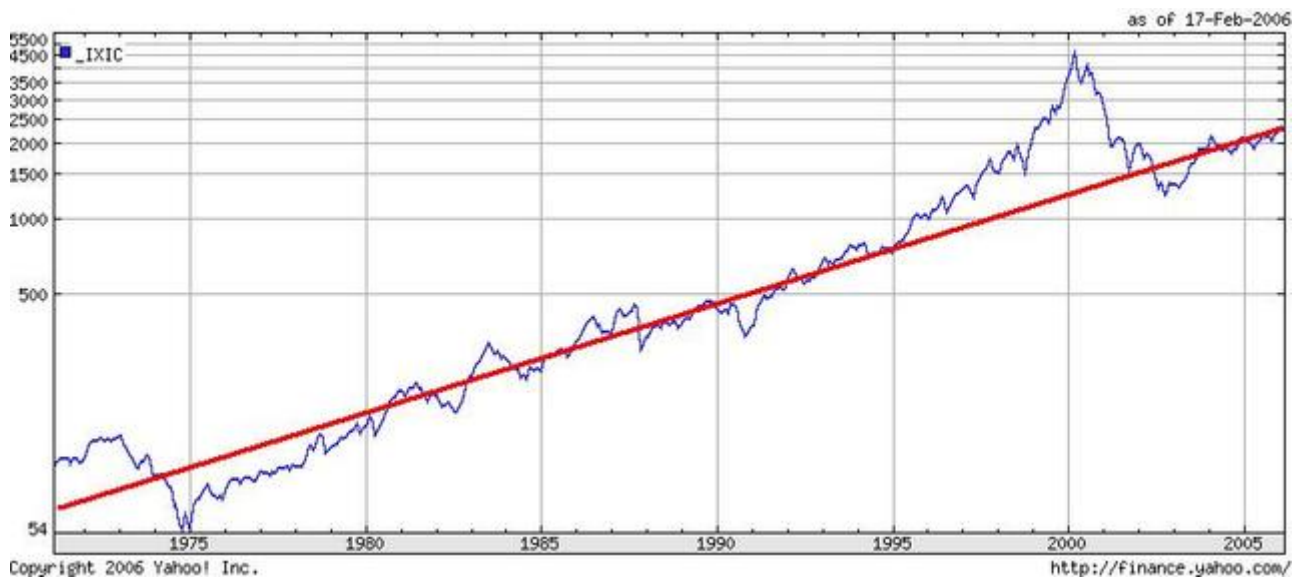
If we see the same image on a logarithmic scale, the exponential trend (which now is a straight line) is clear, and timing the long-term future milestones of the market are semi-predictable.



This also shows that current levels are certainly not overvalued, and are in fact almost exactly where the trendline would expect them to be.

And for those who insist that the Nasdaq should be shown instead, I would point out that a) the Nasdaq has been around for a shorter time, and b) the Nasdaq is less a representation of the broader market than the S&P500, as it is

technology-heavy. Nonetheless, a logarithmic Nasdaq chart also shows a similar trendline, and the late 1990s boom and bust revert back to the trendline.



Part of the reason we don't see an increase in the *rate* of increase in this logarithmic chart (which would make even this line curve upwards gently) is because some of the surplus growth is occurring in overseas markets. A composite chart of the full world's stock markets over the last 55 years would be interesting. If I find a good one, I will add it.

What is the Real Reason the Government Refuses to Seal the Southern Border?

The Futurist · 20 February 2006 · Archived copy · Original

Arguably, the one issue on which the US public and elected officials are most disconnected from one another is the porous US-Mexico border, and the 11 million illegal immigrants who have migrated to the US through it.

At least 70% of the US population wants the border to be sealed, and immigrants to, at the very least, come here through *legal* means. Any politician who takes strong action on this matter is bound to gain tremendous popularity, from voters of both parties. So why does nothing happen? None of the popular explanations hold up, as there are just as many politicians, lobbies, or corporate interests that would oppose each as would support them.

1) **The border is open because businesses want cheap labor.** This cannot be, because illegals use hospital emergency rooms and trauma centers for free, without having paid taxes into the system. This causes the cost of healthcare to rise, and premiums that corporations have to pay for their employee medical insurance rises. These costs are huge, and more than offset any savings from being able to hire these illegals at low cost. Corporations that don't employ many low-skilled workers, such as software companies or investment banks, would thus oppose this.

2) **The border is open because 'of the Hispanic vote'.** This is obviously not the case, as in the 2004 election, Hispanics voted 39% for Bush and 61% for Kerry. That would give the GOP, which controls both houses of Congress, a strong incentive to seal the border, if anything. But they are making only minor efforts.

Furthermore, the suggestion itself is derogatory to law-abiding, legal Hispanics, who certainly don't want *illegal* immigrants coming here any more than non-Hispanics do. Do whites want illegals from Canada? Do blacks want illegals from West Africa? Then why would Cuban-Americans or Puerto-Rican Americans want illegal Mexicans to come here, just because of a common language (not even a common race, in many cases)?

3) **The border is open because to seal it would be racism.** Vicente Fox has said as much, even though every single person of power in the Mexican government is white. Fox has also said that Mexicans in the US do work that 'even blacks will not do'. Mexican postal stamps show caricatures of blacks that would be a national scandal in the US.

There are a number of extremist groups that want to push a radical agenda of creating Mexican states-within-a-state, where US laws and language do not apply, and eventually return the US Southwest to Mexico's possession. The number of American's that would oppose this is far larger than the few fifth-column proponents of it. Plus, non-white politicians could push the agenda. Plus, law-abiding Hispanics don't want this to happen either.

Bogus accusations of racism from fringe groups have not stopped our War on Terror. Why is it stopping this?

4) **The border is open because sealing it would ruin our relationship with Mexico.** Mexico is a nation where drug trade and corruption have created a wealth distribution that is among the most skewed in the world. The poor underclass has no employment options, and Mexico wants them to go to America not only to get rid of them, but also because they remit \$50 billion a year back to their families in Mexico. Mexico's entire economy is dependent on this flow of money.

There is no other country in the world which has the luxury of dumping the poorest 10-15% of its population into another country, and get \$50 billion per year injected into its economy in return. Despite this, the US acts as if it has no leverage over Mexico. It is a colossal failure of the US State Department that despite the huge dependency that Mexico has on the US, the US is not even in a position to ask Mexico for basic favors in America's hour of need, such as a contribution of 5000 troops to our coalition in Iraq. They can't even do that much for us?

Angry yet?

So why does America do nothing to seal the border?

I thought and thought about it, and finally an explanation dawned on me.

After the birth of the baby boom generation concluded in 1964, the number of babies born in the US dropped. Furthermore, Roe v. Wade passed in 1971, and since then, 43 million Americans who may have been born, were not. This resulted in a demographic pit, where the number of babies born was suddenly and permanently lower than in prior decades. Whether abortion should be allowed or not is a separate issue, but what is indisputable is that there are millions of fewer people as a result of it.

Many things that support the US economy, from rising real-estate prices to social security, depend on the US population growing 1% per year, and the ratio of young people to old people remaining fairly stable. European countries are already on the brink of catastrophe due to the shortage of young people in their societies.

US politicians of both parties might have made a sacred agreement to keep the border open so that young Mexicans, born after 1971, can come here and fill the demographic gap that exists in the US. US politicians don't reveal this to the public, because it is too difficult to explain and would result in pressure to overturn Roe v. Wade, lower taxes, provide incentives to families with children, and other political minefields.

That is why they let this continue. This is the best explanation I can think of. Why else would both parties choose to do nothing, despite so much public pressure, yet not explain why?

This is also the worst possible way to solve the demographic shortfall problem, as the current practice :

- 1) Encourages people to break the law. If they broke one law to get here, why not break more after coming here? In California, one third of the prison inmates, each costing the taxpayer \$50,000 per year, are illegal immigrants.
- 2) Has ensured that much more than 50% of the 11 million illegals are male. Women are less inclined to go to the lengths of crossing miles of parched desert, hide in car trunks, or be smuggled in by drug dealers. The gender imbalance only leads to more crime and social problems within these communities.
- 3) Has ensured that these illegals are concentrated in border states rather than spread throughout the nation, thus making it harder for them to assimilate into American society. Legal immigrants do go to all major cities and college towns, and thus assimilate, but these illegals instead become a majority in towns near the border, changing them into being more like Mexico and less like America.
- 4) Has ensured that the majority of immigrants are from one language and culture. If this goal was pursued through a policy of legal immigration, then we would have gotten Chinese, Indians, Russians, Brazilians, etc., who would have to interact with each other and the only language they could do it in would be English. Assimilation would be automatic.

The US may have avoided a massive demographic collapse like what Europe is tumbling into, but the same could have been achieved in so many better ways. This policy of achieving a demographic goal through condoning massive illegal immigration of mostly men from one country will cost American society for decades to come.

What will ultimately result in the border being sealed? One of two simple things :

- 1) If the US government decides that enough young people to fill the demographic gap have arrived, and no additional illegals are needed, then the border will be quietly sealed under the guise of some other reason.
- 2) If a large terrorist attack occurs in the US, and it is found that the terrorists arrived through the porous border with Mexico, then it will be sealed almost immediately, through popular demand by a furious public.

Hopefully, reason 1) occurs before reason 2).

The Impact of Computing : 78% More Each Year

The Futurist · 21 February 2006 · Archived copy · Original

Anyone who follows technology is familiar with **Moore's Law** and its many variations, and has come to expect the price of computing power to halve every 18 months. But many people don't see the true long-term impact of this beyond the need to upgrade their computer every three or four years. To not internalize this more deeply is to miss investment opportunities, grossly mispredict the future, and be utterly unprepared for massive, sweeping changes to human society.

Today, we will introduce another layer to the concept of **Moore's Law**-type exponential improvement. Consider that on top of the 18-month doubling times of both computational power and storage capacity (an annual improvement rate of 59%), both of these industries have grown by an average of approximately 15% a year for the last fifty years. Individual years have ranged between +30% and -12%, but let's say these industries have grown large enough that their growth rate slows down to an average of 12% a year for the next couple of decades.

So, we can crudely conclude that a dollar gets 59% more power each year, and 12% more dollars are absorbed by such exponentially growing technology each year. If we combine the two growth rates to estimate the rate of technology diffusion simultaneously with exponential improvement, we get $(1.59)(1.12) = 1.78$.

The *Impact of Computing* grows at a screaming rate of 78% a year.

Sure, this is a very imperfect method of measuring technology diffusion, but many visible examples of this surging wave present themselves. Consider the most popular television shows of the 1970s, such as *The Brady Bunch* or *The Jeffersons*, where the characters had virtually all the household furnishings and electrical appliances that are common today, *except* for anything with computational capacity. Yet, economic growth has averaged 3.5% a year since that time, nearly doubling the standard of living in the United States since 1970. It is obvious what has changed during this period, to induce the economic gains.

In the 1970s, there was virtually no household product with a semiconductor component. Even digital calculators were not affordable to the average household until very late in the decade.

In the 1980s, many people bought basic game consoles like the Atari 2600, had digital calculators, and purchased their first VCR, but only a fraction of the VCR's internals, maybe 20%, comprised of exponentially deflating semiconductors, so VCR prices did not drop that much per year.

In the early 1990s, many people began to have home PCs. For the first time, a major, essential home device was pegged to the curve of 18-month halvings in cost per unit of power.

In the late 1990s, the PC was joined by the Internet connection and the DVD player, bringing the number of household devices on the Moore's Law-type curve to three.

Today, many homes also have a wireless router, a cellular phone, an iPod, a flat-panel TV, a digital camera, and a couple more PCs. In 2006, a typical home may have as many as 8 or 9 devices which are expected to have descendants that are twice as powerful for the same price, in just the next 12 to 24 months.

To summarize, the number of devices in an average home that are on this curve, by decade :

1960s and earlier : 0

1970s : 0

1980s : 1-2

1990s : 3-4

2000s : 6-12

If this doesn't persuade people of the exponentially accelerating penetration of information technology, then nothing can.

One extraordinary product provides a useful example, the iPod :

First Generation iPod, released October 2001, 5 GB capacity for \$399

Fifth Generation iPod, released October 2005, 60 GB capacity for \$399, or 12X more capacity in four years, for the same price.

Total iPods sold in 2002 : 381,000

Total iPods sold in 2005 : 22,497,000, or 59 times more than 2002.

12X the capacity, yet 59X the units, so $(12 \times 59) = 708$ times the impact in just three years. The rate of iPod sales growth will moderate, of course, but another product will simply take up the baton, and have a similar growth in impact.

Now, we have a trend to project into the near future. It is a safe prediction that by 2015, the average home will contain 25-30 such computationally advanced devices, including sophisticated safety and navigation systems in cars, multiple thin HDTVs greater than 60 inches wide diagonally, networked storage that can house over 1000 HD movies in a tiny volume, virtual-reality ready goggles and gloves for advanced gaming, microchips and sensors embedded into several articles of clothing, and a few robots to perform simple household chores.

Not only does Moore's Law ensure that these devices are over 100 times more advanced than their predecessors today, but there are many more of them in number. This is the true vision of the Impact of Computing, and the shocking, accelerating pace at which our world is being reshaped.

I will expand on this topic greatly in the near future. In the meantime, some food for thought :

Visualizing Moore's Law is easy when viewing the history of video games.

The Law of Accelerating Returns is the most important thing a person could read.

How semiconductors are becoming a larger share of the total economy.

Economic Growth is Exponential and Accelerating, primarily due to information technology becoming all-encompassing.

The Coming Jump in Energy Technology - More Updates

The Futurist · 27 February 2006 · Archived copy · Original

I have two prior posts on what I believe is a new climate ripe for major advances in energy technology. Refer to :

[Why \\$70/barrel oil is good for America.](#)

[The Coming Jump in Energy Technology Advancement](#)

My prediction is that the burden of high energy prices and reliance on unsavory regimes that we currently face will have some serious scares in the next few years, but will abate and no longer be a major crisis by 2015, due to rapid advances in many new areas of technology.

I claim that there will be no single technology that saves us, but rather many fields of innovation that slay the monster with a thousand small cuts.

Some more examples of promising advances :

[A new method of converting previously unusable husks and stalks to ethanol.](#)

[A business renting out biodiesel cars in Los Angeles sets up shop.](#)

[A battery breakthrough.](#)

[GE has created a machine that cuts the cost of producing hydrogen fuel by more than half.](#)

[Solar energy costs are dropping quickly.](#) The reason this is happening now instead of at any time over the last 30 years is because solar cells are made of the same materials that computational chips are made of, and thus inevitably converge into [The Impact of Computing](#).

[A startup attempting to make a 330 MPG hybrid.](#) [Another attempting to reach 250 MPG.](#) While this may be unrealistic, if they make even moderate progress, their IP would be sold and used elsewhere.

None of these will singlehandedly change the world. However, each bit of innovation makes the economics of the whole ecosystem a tiny bit better, which cumulatively adds up to a lot.

I have no hesitations in predicting that the average-priced 2015 model family sedan, with a 240 hp engine, will deliver 60 MPG. On top of this, the fuel itself may have a large ethanol component, and will contain much less gasoline per gallon than today.

Keywords : Ethanol, oil price, energy innovation, solar power, wind power, energy technology, tar sands, oil shale, hybrid car, hydrogen car

Futuristic Construction Materials

The Futurist · 28 February 2006 · Archived copy · Original

Here is a fun slideshow in [BusinessWeek today](#), in the upper-left corner of the article. Materials such as translucent concrete that lets 10% of natural daylight through the walls, and a composite wood that actually conducts electricity



are now a reality.

While these materials are expensive, their costs are dropping rapidly, as the advanced molecular science behind them is, after all, an information technology. The translucent concrete cost will, over many years, converge with that of ordinary concrete. Plus, the money saved from consuming less electricity on indoor lighting, and thus fewer maintenance people needed to replace indoor tubelights, would also enter the cost equation.

An inflection point may occur with a major new skyscraper in Asia choosing to use some of these materials in some superluxury hotel on the upper floors, or someone like Donald Trump or Steve Wynn adding this as a feature to a new, highly publicized building. The massive exposure will bring more competition, accelerating improvements and driving down prices.

This will be a very fun one to watch over the next several years.

Keywords : Futuristic materials, Donald Trump new building, transparent concrete.

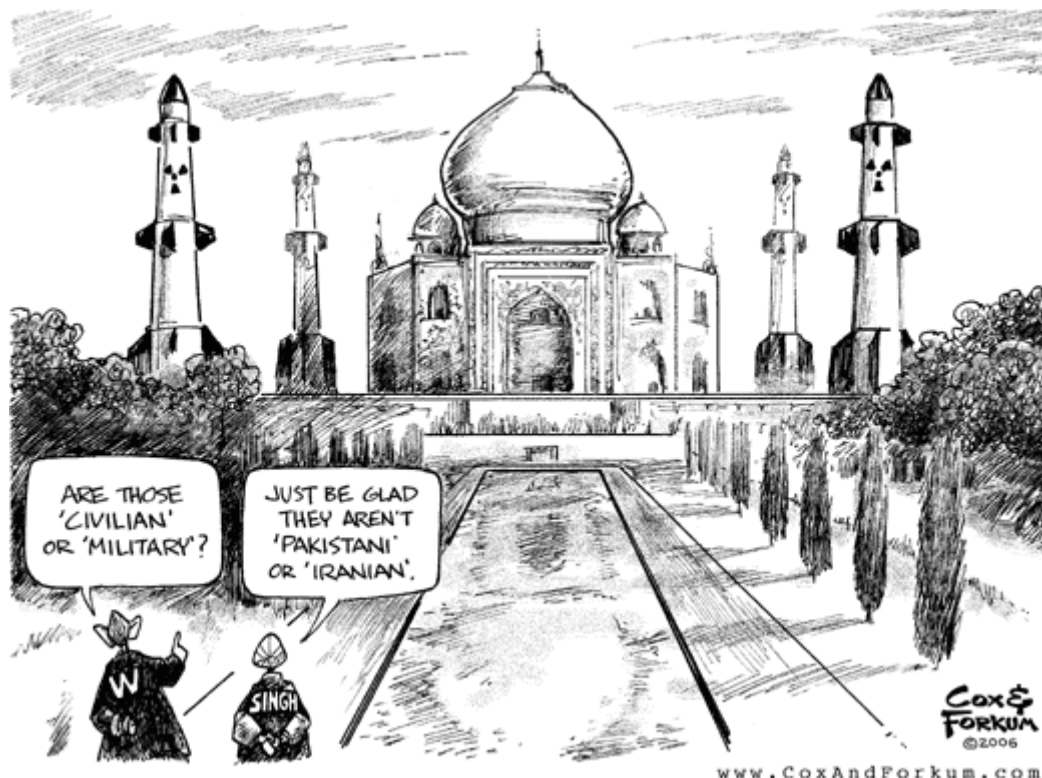
Nuclear Deal Signed with India, American Diplomat Killed in Pakistan

The Futurist · 2 March 2006 · Archived copy · Original

President Bush's critical visits to India and Pakistan were bound to be anything but dull, and two events have occurred in the last 12 hours that signify not only the diverging brand images of both India and Pakistan, but also how many issues of global importance converge on this region.

India and the US have signed a nuclear energy agreement. This not only helps world oil prices by easing India's demand for oil, it is essentially a stamp of approval for India as a responsible, democratic chaperone of nuclear weapons.

This cartoon from Cox and Forkum says it all.



Things are not so rosy over in Pakistan. A US diplomat was killed by an Al-Qaeda suicide bomber, an attack strategically planned to complicate Bush's visit there later this week. Additionally, a major terrorist commander was captured in Bangladesh, a country that used to be part of Pakistan until 1971. The mainstream media barely mentions this.

As India's brand image evolves to one of a globally influential democracy with rapidly growing, knowledge-based industries, the brand image of Pakistan continues to degenerate into that of a state full of Al-Qaeda terrorists and those sympathetic towards them. This cannot be attributed to Islam alone, as India still has about the same aggregate number of Muslims as Pakistan, yet Indian Muslims rarely have been the cause of such suicide-bombings.

This is also apparent in this Pew survey, indicating that India has a higher opinion of the US than almost any other country, whereas Pakistan is at the other end of the scale, mostly viewing the US negatively.

We are witnessing a divergence in the fortunes of India and Pakistan (and Bangladesh), which were all one country until 1947. Can Pakistan change from a dangerous path to join Indian on a productive one? For the future of the world, it must.

India, Indo-US ties, India nuclear deal, Indian economy, India outsourcing

Are You Prepared to Live to 100? - Part I

The Futurist · 6 March 2006 · Archived copy · Original

There is a lot of speculation about whether new medical science will allow not just newborn babies to live until 100, but even people who are up to 40 years old today. But how much of it is realistic?

At first glance, human life expectancy appears to have risen greatly from ancient times :

Neolithic Era : 22

Roman Era : 28

Medieval Europe : 33

England, 1800 : 38

USA, 1900 : 48

USA, 2005 : 78

But upon further examination, the low life expectancies in earlier times (and poorer countries today) are weighed down by a high infant mortality rate. If we take a comparison only of people who have reached adulthood, life expectancy may have risen from 45 to 80 in the last 2000 years. This does not appear to be as impressive of a gain rate.

But, if you index life expectancy against Per Capita GDP, then the slow progress appears differently. Life expectancy began to make rapid progress as wealth rose and funded more research and better healthcare, and since **Economic Growth is Accelerating**, an argument can be made that if lifespans jumped from 50 to 80 in the 20th century, they might jump to 100 by the 2020s.

But that still seems to be too much to expect.



We hear that if cancer and cardiovascular disease were cured, average lifespans in America would rise into the 90s. We acknowledge that medical knowledge is doubling every 8 years or so. We see in the news that a gene that switches off aging has been found in mice. We even know that the market demand for such biotechnology would be so great - most people would gladly pay half of their net worth to get 20 more healthy, active years of life - that it will attract the best and brightest minds.

Yet something within us is doubtful....

(stay tuned tomorrow for **Part II**)

Advances in Automobile Technology : Safety

The Futurist · 6 March 2006 · Archived copy · Original

Earlier articles have discussed the murmur of activity building up in the field of energy technology, and how the **sum total of many different fields of innovation will add up to big cumulative advancements**. I even go so far as to predict that there will be average-priced family sedans in 2015 that deliver 60 MPG even with 240 hp engines. But that is not the only field of exciting advances that the automobile will see over the same period.

Today, about 42,000 Americans die each year in road accidents. Most of these are young people, including thousands of children. On top of the tragic loss of life, this is very costly to the economy. From police, ambulance, emergency room, insurance, legal, and funeral resources to the productivity lost, each casualty may cost an average of \$2 million. This totals to \$84 billion in cost to the US economy each year. However, one detail has gone nearly unnoticed about this grim statistic : the number has not risen in over a decade, despite population and automobile growth.

Here is a table with details on the last 10 years of traffic fatalities. The deaths per mile traveled, and in proportion to the population, has been dropping by 1-2% per year. Recent additions, such as side airbags and stronger body frames, have been percolating through the system.

The rate of fatality reduction will begin to slightly accelerate with a raft of new innovations about to make their way into cars. Nanotechnology is bringing new materials science to car parts, with strong carbon fiber components weighing a fraction of their steel predecessors. With lighter vehicle weights and stronger bumpers fewer accidents will be fatal, with continual improvement through each successive advance in nanomaterials.

As guaranteed by **The Impact of Computing**, more electronic intelligence will percolate into cars in the form of revolutionary safety systems. **Night Vision, Lane Departure Warnings, and Collision Avoiding Cruise Control are already available in luxury cars**, and will rapidly improve while becoming standard, inexpensive features in all cars. **The Impact of Computing** necessitates that even if such systems cost \$5000 today, a system 5 times better may cost under \$100 in ten years.

The nanomaterials and electronic systems may at first generate false complacency and carelessness among drivers, who assume that the safety systems can negotiate any situation. Once this belief dissipates, we will see accelerating declines in annual traffic deaths each year. This will spare the lives of thousands of children who might not have otherwise had a chance to become adults. Economically, this will translate into lower auto, medical, and life insurance premiums, fewer traffic jams, and less wastage of police resources.

Prediction : By 2020, average US traffic deaths will have dropped to only 25,000 per year, despite the greater US population by then. This is against 43,000 in 2004 and 42,000 in 1995.

Are You Prepared to Live to 100? - Part II

The Futurist · 8 March 2006 · Archived copy · Original

Refer back to [Part I here](#), where we discuss that despite the many stunning advances in medicine, there is still something within us that doubts that our present lives could be extended to 100 years.

The exponentially progressing advances in genomic and proteomic science will cure many genetic predispositions that an individual may have to certain diseases, again, with medical knowledge currently doubling every 8 years. Programmable nanobots that can keep us healthy from inside, by detecting cancerous cells or biochemical changes very early, are also a near-certainty by the 2020s. Furthermore, if just half of the world's **8 million millionaires** were each willing to pay \$500,000 to add 20 healthy, active years to their lives, the market opportunity would be (4 million X \$500,000) = \$2 trillion. The technological trend and market incentive is definitely in place for revolutions in this field.

But that is still not quite enough to assure that the internal mechanisms that make cells expire by a certain time, or the continuous damage done by cosmic rays perpetually going through our bodies, can be fully negated.

Ray Kurzweil, in his essay "[The Law of Accelerating Returns](#)", seems confident that additions to human lifespan will grow exponentially. While I agree with most of his conclusions in other areas, over here, I am not convinced that this growth is accelerating at the moment. I feel that the new advances will be increasingly more complex, and only the most high-informed and disciplined individuals will be able to capitalize on the technologies available to them to extend their lifespan. This will benefit a few people, but not enough to lift the broader average by much.

However, where I do agree with Kurzweil and other Futurists is the concept of a **Technological Singularity** and **Post-Human existence**. The advances in biotechnology and nanotechnology will become so advanced that humans will be able to reverse-engineer their brains re-engineer their entire bodies down to the molecular level. In fact, you could effectively transfer your 'software' (your mind) into upgraded hardware. This is not as crazy as it sounds, as even today, many devices are used within or near the body in order to prolong or augment human life, and many of these are fully part of [The Impact of Computing](#); so both their sophistication and number could rise rapidly.

This potentially will afford immortality to the human mind for those fortunate enough to be around in 2050 or so. Of course, as the years progress, we will have a better idea of how realistic this possibility actually is.

So that is my conclusion. Average human life expectancy will make moderate but unspectacular gains for the next 50 years, with only those who maintain healthy lifestyles and are deeply aware of the technologies available to them living past the age of 100. This will be true until the Technological Singularity, where humans **may** be able to separate their minds from their bodies, and reside in different, artificially engineered bodies. This is a vast subject which I will describe in more detail in future posts. [For some reading, go here.](#)

Also read about [The Longevity Dividend](#).

These Are the Best of Times

The Futurist · 11 March 2006 · Archived copy · Original



When we read stories or watch films set in a historical context, it is seductive to romanticize about being an Egyptian Pharaoh, an English Knight, an Arab Sultan, or an 18th century French Aristocrat. But how desirable were their daily lives compared to ours today?

First, refer back to the articles on [Historical Life Expectancy](#), and [Exponential and Accelerating Economic Growth](#). Both show that the improvements in human life over the 20th century dwarf the improvements made in all of human history before then.

But surely the people at the very top of society, at any time in history, had enviable lives, did they not? To put this perspective, we need not go back any further than a century.

Consider John D. Rockefeller, a name nearly synonymous with wealth. At one point he had a net worth as high as 1/65th of US GDP at that time, a figure that would be the equivalent of \$190 Billion today - four times what Bill Gates currently has. He owned land, employed people, and had political clout that would seem extraordinary at any time in history. But, having died in 1937 at the age of 98, Rockefeller never had photographs of his childhood, never watched a color film, never flew in a jet engine airplane, and never saw a photograph of the Earth taken from space. If Rockefeller wished to travel from New York to Chicago, it took him and his entourage more than a day. If his servant cut him during a morning shave (or even if he did it himself), a cloth bandage was the only kind available. His underwear did not have elastic, and since no cohort of servants could have realistically alleviated that problem for him, he probably spent every day accustomed to irritating hassles that would be unacceptable to even the poorest Americans today. He couldn't have even obtained a tube of mint-gel toothpaste or a can of chilled Coca-Cola from a soda machine.

The same applied to Cornelius Vanderbilt, Andrew Carnegie, and JP Morgan. While they had immense political, purchasing, and hiring power, the diversity of what they could do was limited by our standards, and we might actually have found some portions of their lifestyles to be inconvenient and monotonous. They, in turn, had electricity, phonographs, railroads, and slow automobiles that may have made them think that the world of Benjamin Franklin and George Washington was deprived, and so on.

Even as the ability to purchase land and hire the services of others has become increasingly expensive with time



(but still at a rate consistent with GDP growth), the cost and diversity of goods available to the average person continues to improve remarkably, and, of course, this trend will continue to accelerate.

While it took electricity, automobiles, and air travel decades to evolve from invention to commoditization in the United States, the process of diffusion is now shortening to years. One merely needs to internalize [The Impact of Computing](#) to grasp this surging pace. Needless to say, if we can chuckle at the limitations of John D. Rockefeller's world a century later, by 2030 we may be able to poke fun at our own world of 2006 to the same extent. A world where there were no hypersonic passenger aircraft, no intelligent robots, no self-driving cars, no virtual reality

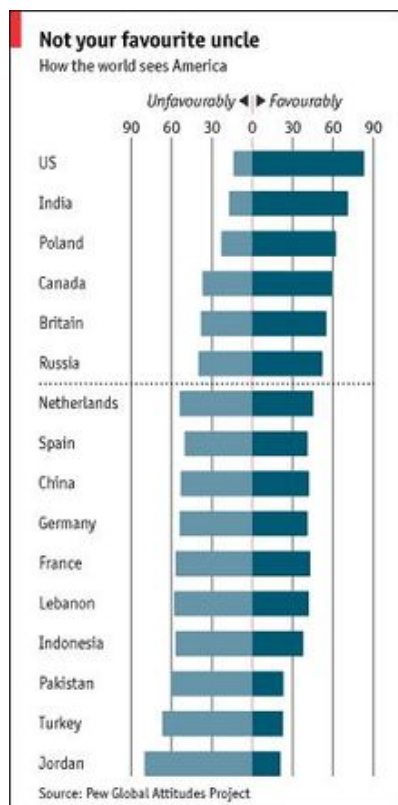
entertainment, and no easy cure for cancer may seem brutal and boring by then.

Thus, the advance and democratization of technology transcends perceptions about wealth and poverty over the course of time, and it is debatable whether it was better to be a super-wealthy American in 1920, a moderately wealthy American in 1960, or an average American in 2006. Which would you choose?

Who Hates America?

The Futurist · 13 March 2006 · Archived copy · Original

An interesting survey by the [PewResearchCenter](#), cited in The Economist, asks the citizens of several countries for their opinion of the United States. Comparing this to the socioeconomic history and current characteristics of each of these nations allows some correlations to present themselves.



In the US itself, 17% view their country negatively. I have claimed earlier that

8-10% of the US population comprises of active or semi-active fifth-columnists, who seek to undermine American strength and security, yet cannot bring themselves to openly admit this deeply held belief, nor move to another country. This survey appears to offer further evidence of this fifth column.

Next comes the big surprise. Most Americans are entirely unaware that the most pro-US foreign country in the world is India. It is also one of the only countries where George W. Bush is more highly regarded than in the US. The reason for this is that during the period of Indian socialism and economic isolation (1947-91), Indians were fed a constant diet of anti-American, anti-capitalism propaganda. The utter failure of India's socialist policies, combined with the emergence of the Indian-American community as the wealthiest ethnic group in the US, led to a deep appreciation for a socioeconomic system proven to empower Indians. As a democracy, Indians could understand America more readily than the Chinese or Arabs could. All this has led to a nation with 3 times the population of Europe trending towards becoming one of America's closest economic, political, ideological, and military allies.

Other pro-America nations such as Poland and Russia have also made the assumption that anti-American, socialist practices failed to deliver economic benefits for decades, so the opposite approach must be more beneficial.

Anti-Americanism does dominate among many non-English-speaking European countries. Americans may be saddened by this, considering how American sacrifices in troops and resources have saved Europe twice in the last 65 years. Most of these countries have declining populations and a shortage of children being produced. It is ironic that people such as the French and Germans, who consider their societies to be so great, have little desire to continue it through producing another generation of French and German people. Their crushing entitlement programs and demographic time bomb have doomed their societies, and the unwillingness of America to follow

them down this path has caused great envy towards America among 55-70% of the population in some European countries. [Read this article from Germany's *Der Spiegel*](#), authored by a rare European with a sense of historical context.

Lastly, the most staunch anti-Americanism is present among undemocratic Islamic societies. This is not a surprise. However, not included in this survey are Afghanistan and Iraq, where pro-American sentiments are slightly dominant.

The next time a fashion-parroting ignoramus or fifth-columnist informs you of how 'the rest of the world hates America', forward them this article, and remind them that India has more people than Europe and the Middle East put together. The delusions of fifth-columnists represent merely their fanatical hatred of a society that celebrates meritocracy, strong families, a powerful and proud military, and a great thirst for achievement.

Also refer them to [this superb article by Victor Davis Hanson](#) on how America can judge itself on the character of societies that exhibit anti-Americanism, and how most of their rhetoric masks a deep shame at being dependent on America. He states :

When Europe orders all American troops out; when Japan claims our textbooks whitewash the Japanese forced internment or Hiroshima; when China cites unfair trade with the United States; when South Korea says get the hell off our DMZ; when India complains that we are dumping outsourced jobs on them; when Egypt, Jordan, and the Palestinians refuse cash aid; when Canada complains that we are not carrying our weight in collective North American defense; when the United Nations moves to Damascus; when the Arab Street seethes that we are pushing theocrats and autocrats down its throat; when Mexico builds a fence to keep us out; when Latin America proclaims a boycott of the culturally imperialistic Major Leagues; and when the world ignores American books, films, and popular culture, then perhaps we should be worried. But something tells me none of that is going to happen in this lifetime.

Nicely put. [Also read why America will still be the only superpower by 2030.](#)

Update : Some anti-Americans have exhibited racism towards Indians in the comments section, frustrated that a group of dark-skinned people can be economically successful and pro-American. They have also said that the survey has been rigged to falsely show that some countries are pro-US, but simultaneously claim that the same survey has not been rigged in countries that turned out to be anti-US. These anti-Americans, as usual, cannot answer simple questions posed to them. Read all about it in the comments section.

World GGP Grew by 4.3% in 2005

The Futurist · 17 March 2006 · Archived copy · Original

The World GGP (Gross Global Product) grew by a strong 4.3% in 2005. While this rate would merely be considered robust today, it **is a rate unheard of before the mid-20th century**. In fact, prior to the 16th century, 4.3% growth was what the world economy might have seen in an entire century, rather than just a single year.

Refer to how **Economic Growth is Exponential and Accelerating** for a detailed study.

However, this growth, which added \$1.8 trillion to the now \$44 trillion world economy, was not evenly distributed at all. In fact, more than one third of the \$1.8 trillion was generated in just the US and China. A breakdown of the wealth creation, by country (in direct currency conversion, not purchase power parity (PPP)) :

United States : 25.0%

EU (a collection of 24 separate countries) : 12.6%

China : 9.5%

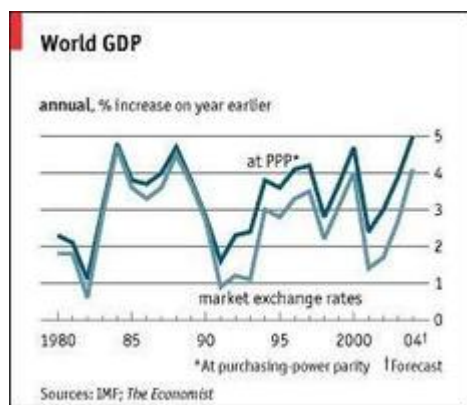
Japan : 5.8%

India : 3.0%

Russia : 2.5%

Rest of World : 41.6%

A large economy with a slow growth rate, like that of the EU, produces a similar portion of the pie as a small economy with a high growth rate, like that of China. This also means that India and China will soon be contributing a much larger percentage of the pie, as their currencies appreciate through increased exports.



In viewing historical World GDP Growth from The Economist, we can not only see that there has not been a year without growth since 1980, but that the difference between nominal and PPP growth rates have been diverging due to India and China. Continued growth will result in currency appreciation for both (China is already forcibly keeping its currency undervalued), and will bring the light-blue nominal line up to the level of the darker PPP line. **The awakening of India and China to supercharge the global economy is effectively the single biggest event of the last 15 years.**

This could push the world GGP growth trendline over 5% by 2020, and would be consistent with the expected continued acceleration of the world's economy in the 21st century.

The Winds of War, The Sands of Time - Part I

The Futurist · 19 March 2006 · Archived copy · Original



Given the massive media coverage of the Iraq War, and the pop-culture fashion of being opposed to it, one could be led to think that this is one of the most major wars ever fought. Therein lies the proof that we are actually living in the most peaceful time ever in human history.

Just a few decades ago, wars and genocides killing upwards of a million people were commonplace, with more than one often underway at once. Remember these?

Second Congo War (1998-2002) : 3.6 million deaths

Iran-Iraq War (1980-88) : 1.5 million deaths

Soviet Invasion of Afghanistan (1979-89) : 1 million deaths

Khmer Rouge (1975-79) : 1.7 million deaths from genocide

Bangladesh Liberation War (1971) : 1.5 million deaths from genocide

Vietnam War (1957-75) : 2.4 million deaths

Korean War (1950-53) : 3 million deaths

This list is my no means complete, as wars killing fewer than one million people are not even listed. **At least 30 other wars killed over 20,000 people each, between 1945 and 1989.**

If we go further back **to the period from 1900-1945**, we can see that multiple wars were being simultaneously fought across the world. Going further back still, **the 19th century had virtually no period without at least two major wars being fought.**

We can thus conclude that by historical standards, the current Iraq War is tiny, and can barely be found **on the list of historical death tolls.** That it gets so much attention merely indicates how little warfare is going on in the world.

Why have so many countries quietly adapted to peaceful coexistence? Why is a war between Britain and France, or Russia and Germany, or the US and Japan, nearly impossible today?

[image] We can start with the observation that **never have two democratic countries, with per-capita GDPs greater than \$10,000/year, gone to war with each other.** The decline in warfare in Europe and Asia correlates closely with multiple countries meeting these two conditions over the last few decades, and this can continue as more countries graduate to this standard of freedom and wealth. The chain of logic is as follows :

- 1) Nations with elected governments and free-market systems tend to be the overwhelming majority of countries that achieve per-capita incomes greater than \$10,000/year. Only a few oil-rich monarchies are the exception to this rule.
- 2) A nation with high per-capita income tends to conduct extensive trade with other nations of high prosperity,

resulting in the ever-deepening integration of these economies with each other. A war would disrupt the economies of both participants as well as those of neutral trading partners. Since the citizens of these nations would suffer financially from such a war, it is not considered by elected officials.

3) As more of the world's people gain a vested interest in the stability and health of the interlocking global economic system, fewer and fewer countries will consider international warfare as anything other than a lose-lose proposition.

4) More nations can experience their citizenry moving up **Maslow's Hierarchy of Needs**, allowing knowledge-based industries thrive, and thus making international trade continuously easier and more extensive.

5) Since **economic growth is continuously accelerating**, many countries crossed the \$10,000/yr barrier in just the last 20 years, and so the reduction in warfare after 1991 years has been drastic, even if there was little apparent reduction over the 1900-1991 period.

This explains the dramatic decline in war deaths across Europe, East Asia, and even Latin America over the last few decades. Thomas Friedman has a similar theory, called the Dell Theory of Conflict Prevention, wherein no two countries linked by a major supply chain/trade network (such as that of Dell Computer), have ever gone to war with each other, as the cost of war is prohibitive to both parties. But what can we expect in the future? Stay tuned for **Part II** tomorrow.

The Winds of War, The Sands of Time - Part II

The Futurist · 21 March 2006 · Archived copy · Original

Refer to [Part I](#) for the reasons behind the rapidly declining proportion of warfare being conducted in the world as time progresses. As more nations achieve prosperity and democracy, the costs of war outweigh the benefits.

To predict the future risk of major wars, we can begin by assessing the state of some of the largest and/or riskiest countries in the world. Success at achieving democracy and a per-capita GDP greater than \$10,000/yr are highlighted in green. We can also throw in the [UN Human Development Index](#), which is a composite of these two factors, and track the rate of progress of the HDI over the last 30 years. In general, countries with scores greater than 0.850 have met the aforementioned requirements of prosperity and democracy. There are [many more countries with a score greater than 0.850 today than there were in 1975](#).

Let's see how some select countries stack up.

	Pop. (M)	2005 GDP/person (PPP)	Democracy	HD Score 1975	HD Score 2003
China	1306	\$6,200	No	0.500	0.730
India	1080	\$3,400	Yes	0.412	0.602
Russia	143	\$10,700	Partial	0.800	0.795
Iran	68	\$8,100	No	0.566	0.736
Iraq	26	\$3,400	Yes, at risk	~ 0.500	~ 0.600
Indonesia	242	\$3,700	Partial	0.468	0.697
Pakistan	163	\$2,400	No	0.363	0.527

China : The per-capita income is rapidly closing in on the \$10,000/yr threshold, but democracy is a distant dream. [I have stated that China will see a sharp economic slowdown in the next 10 years](#) unless they permit more personal freedoms, and thus nurture entrepreneurship. Technological forces will continue to pressure the Chinese Communist Party, and if this transition is moderately painless, the ripple effects will be seen in many other communist or autocratic states that China supports, and will move the world strongly towards greater peace and freedom. The single biggest question for the world is whether China's transition happens without major shocks or bloodshed. I am optimistic, as I believe the CCP is more interested in economic gain than clinging to an ideology and one-party rule, which is a sharp contrast from the Mao era where 40 million people died over ideology-driven economic schemes. **Cautiously optimistic.**

India : A secular democracy has existed for a long time, but economic growth lagged far behind. Now, India is catching up, and will soon be a bulwark for democracy and stability for the whole world. India is only now realizing how much the world will depend on it. **Very optimistic.**

Russia : A lack of progress in the HDI is worrisome. It could yet undo the peaceful transition from the Soviet system that the world benefit from. Hopefully, energy and technology industries can help Russia increase its population growth rate, and up its HDI. **Cautiously optimistic.**

Indonesia : With more Muslims than the entire Middle East put together, Indonesia took a large step towards democracy in 1999 (improving its HDI score), and is doing moderately well economically. Economic growth needs to accelerate in order to cross \$10,000/yr by 2020. **Cautiously optimistic.**

Pakistan : The divergence between the paths of India and Pakistan [has been recognized by the US](#), and Pakistan, with over 50 nuclear warheads, is also where Osama bin Laden and thousands of other terrorists are currently hiding. Any major terrorist attack will inevitably be traced to individuals operating in Pakistan, which has regressed from democracy to dictatorship, and is teetering on the edge of religious fundamentalism. The economy is growing quickly, however, and this is the only hope of averting a disaster. **Pessimistic.**

Iraq : Although Iraq is not a large country, its importance to the world is disproportionately significant. Bordering so many other non-democratic nations, if Iraq can succeed, the pressure on its neighbors to adapt will be immense. The destiny of the US is also intertwined with Iraq, as the outcome of the current War in Iraq will determine the

ability of America to take any other action, against any other nation, in the future. **Cautiously optimistic, but depends on America's resolve.**

Iran : Many would be surprised to learn that Iran is actually not all that poor, and the Iranian people have enough to lose that they are not keen on a large war against a powerful coalition. However, the autocratic regime that keeps the Iranian people suppressed has brutally quashed democratic movements. The secret to turning Iran into a democracy is its neighbor, Iraq. If Iraq can succeed, the pressure on Iran exerted by Internet access and globalization next door will be immense. This will continue to nibble at the edges of Iranian society, and the regime will collapse before 2015 even without a US invasion. If Iran's leadership insists on a confrontation over their nuclear program, the regime will collapse even sooner. **Cautiously optimistic, pending Iraq.**

So Iraq really is a keystone state, and the struggle to prevail over the forces that would derail democracy has major repercussions for many nations. The US, and the world, cannot afford for Iraq to fail. If we succeed, the world of 2015 will have stamped out belligerence from yet another formerly notorious region. At this point, all remaining roads to disastrous tragedy lead to Pakistan.

As long as Pervez Musharaff runs Pakistan, he may manage to keep it from flying apart into fanatical fragments. But the fact that the **father of Pakistan's nuclear program was selling nuclear secrets**, and that the likes of Osama bin Laden have found sanctuary in Pakistan, makes for a very worrisome combination. The ultimate 'day of infamy' could be upon us long before Pakistan has any chance of attempting to restore democracy or achieving economic prosperity.

But smaller-scale terrorism is nothing new. It just was not taken as seriously back when nations were fighting each other in much larger conflicts. The **1983 Beirut bombing** that killed 241 Americans did not dominate the news for more than two weeks, as it was during the far more serious Cold War. Today, the *absence* of wars between nations brings terrorism into the spotlight that it could not have previously secured.

Wars against terrorism are a paradigm shift, because where a war like World War II involved symmetrical warfare between declared armies, the War on Terror involves *asymmetrical* warfare in *both* directions. Neither party has yet gained a full understanding of the power it has over the other.



A few terrorists with a small budget can kill thousands of innocents without confronting a military force. Guerilla warfare can tie down the mighty US military for years until the public grows weary of the stalemate, even while the US cannot permit itself to use more than a tiny fraction of its power in retaliation. Developed nations spend vastly more money on political and media activities centered around the mere discussion of terrorism than the terrorists themselves need to finance a major attack on these nations.

At the same time, pervasively spreading Internet access, satellite television, and consumer brands continue to disseminate globalization and lure the attention of young people in terrorist states. This unrelentingly and irreversibly erodes the fabric of pre-modern fanaticism at almost no cost to the US and other free nations. The efforts by fascist regimes to obstruct the mists of the information ethersphere from entering their societies is so futile as to be comical. Bidirectional asymmetry is the new nature of war, and the side that learns how to harness the asymmetrical advantage it has over the other is the side that will win.

It is the wage of prosperous, happy societies to be envied, hated, and forced to withstand threats that they cannot

reciprocate back onto the enemy. The US has overcome foes as formidable as the Axis Powers and the Soviet Union, yet we appear to be at a stalemate against a pre-modern, unprofessional band of deviants that does not even have the resources of a small nation and has not invented a single technology. The new war is thus ultimately not with the terrorists, but with ourselves - our complacency, short attention spans, and propensity for fashionable ignorance over the lessons of history. Whether we awaken to the advantages we do have over our enemies before or after the terrorists get a bit too lucky and kill a million of us in a day remains to be seen.

Finding Earth-like Planets Will Soon be Possible

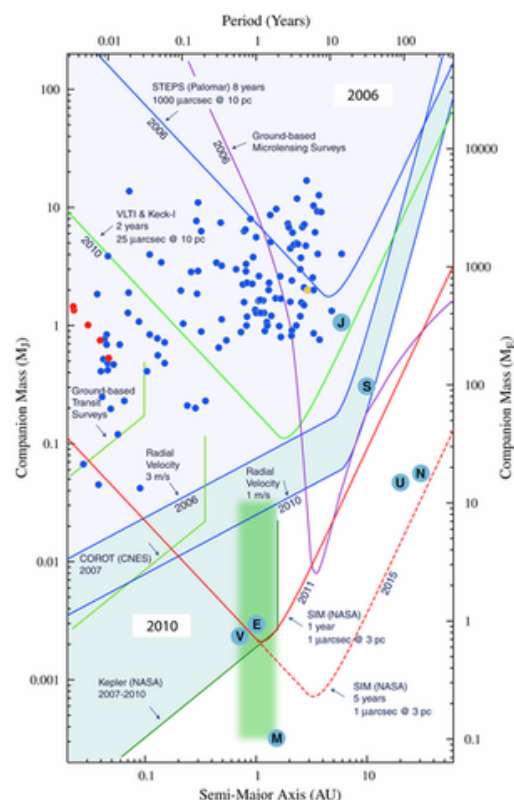
The Futurist · 26 March 2006 · Archived copy · Original

First, the Earth (whether flat or spherical) was considered to be the center of the universe. Then, the Sun was considered to be center of the universe. Eventually, mankind came to realize that the Sun is just one of 200 to 400 billion stars within the Milky Way galaxy, which itself is just one among hundreds of billions of galaxies in the known universe, and there may even be other universes.

Astronomers have long believed that many stars would have planets around them, including some Earth-like planets. Carl Sagan wrote and spoke extensively about this in the 1970s and 80s, but we did not have the technology to detect such planets at the time, so the discussions remained theoretical. There were no datapoints by which to estimate what percentage of stars had what number of planets, of which what fraction were Earth-like.

The first confirmed **extrasolar planet** was **discovered in 1995**. Since then, continually improving technology has yielded discovery of more than one per month, for a grand total of about 176 to date. So far, most known extrasolar planets have been Jupiter-sized or larger, with the detection of Earth-sized planets beyond our current technology.

But the **Impact of Computing** is finding its way here as well, and new instruments will continue to deliver an exponentially growing ability to detect smaller and more distant planets. Mere projection of the rate of discovery since 1995 predicts that thousands of planets, some of them Earth-sized, will be discovered by 2015. To comfortably expect this, we just need to examine whether advances in astronomical observation are keeping up with this trend. Let's take a detailed look at the chart below from a **Jet Propulsion Laboratory publication**, which has a lot of information.



The bottom horizontal axis is the distance from the star, and the top horizontal axis is the orbital period (the top and bottom can contradict each other for stars of different mass, but let's put that aside for now). The right vertical axis is the mass as a multiple of the Earth's mass. The left vertical axis is the same thing, merely in Jupiter masses (318 times that of the Earth).

Current detection capability represents the area above the purple and first two blue lines, and the blue, red, and yellow dots represent known extrasolar planets. Planets less massive than Saturn have been detected only when they are very close to their stars. The green band represents the zone on the chart where an Earth-like planet, with similar mass and distance from its star as our Earth, would reside. Such a planet would be a candidate for life.

The **Kepler Space Observatory** will launch in mid-2008, and by 2010-11 will be able to detect planets in the green zone around stars as far as 1000 light years away. It is set to examine 100,000 different stars, so it would be very surprising if the KSO didn't find dozens of planets in the green-zone.

After 2015, instruments up to 1000 times more advanced than those today, such as the **Overwhelmingly Large Telescope** and others, will enable us to conduct more detailed observations of the hundreds of green-zone planets that will be identified by then. We will begin to get an idea of their color (and thus the presence of oceans) and atmospheric composition. From there, we will have a distinct list of candidate planets that could support Earth-like life.

This will be a fun one to watch over the next decade. Wait for the first headline of 'Earth-like planet discovered' in 2010 or 2011.

Protesting for More Work, Protesting for Less Work

The Futurist · 29 March 2006 · Archived copy · Original

A strange world we live in. In the US, there were massive protests of illegal immigrants in many major US cities, including a march of 500,000 participants in Los Angeles. It is unheard of that so many people who are in a country illegally could assemble in a major city and wave the flags of another country while making demands for more rights from their host nation. American flags were even taken down in one or two instances, even though these people are strongly opposed to returning to Mexico.

As absurd as this outrage is, it could be far, far worse. What if the Los Angeles protests were not peaceful?

In France, economic stagnation and unemployment rates of 22% for young people (and up to 50% for immigrant Muslims) have brought French society to a nightmare worse than most Americans could even imagine. In an attempt to make just a small dent in this problem, Prime Minister Dominique de Villepin suggested that employers should have to power to terminate underperforming employees under the age of 26. The job security of underperforming employees over the age of 26 are not even being discussed yet. This would enable businesses to feel less cautious about hiring a new employee, knowing that they could discharge the employee for poor performance. In turn, this would permit more young people, particularly underprivileged Muslim youths, to earn a living. **But the culture of entitlement and rationalization of sloth in France is so great** that even this minor dose of capitalism provoked upper-class French youths into riots, with cars **being torched and riot police having to use teargas**. It is telling that so many of these upper-crust people want guaranteed job security even at the cost of creating a fertile climate for small businesses and decreasing the unemployment of Muslim youths. What about being entrepreneurs themselves? What about *egalite and fraternite*?



A few months earlier, **Islamic youths rioted in France** for a host of reasons including their 50% unemployment rate. In essence, they are fed up with bearing the brunt of the government-supported laziness of the upper-class students mentioned above. Over 4000 cars were torched over the 16-day uprising. These two groups are on a collision course for an explosive confrontation in the near future.

The anti-business entitlement mentality has doomed French society, and that of continental Europe as a whole. Crushing taxation and stagnant wages have made it prohibitively expensive to have children. Socialized medicine has made doctors apathetic, which **led to the deaths of 15,000 people in France and 20,000 in Italy from a heat wave**. Economic growth is shameful, with the **entire EU producing only half as much new wealth as the US**, despite a larger population. US unemployment has not been above 10% in the last 25 years, even as Europe has experienced this for most of the last decade.

It is almost too late for Europe to reverse its population decline and its invasion by hostile, unassimilable foreigners. Sure, if Europe slashed its tax rates by a third, overhauled labor laws to be more pro-business, and incentivized young couples with a reward for having three children, they could save themselves. But if even a tiny reform like Villepin's provokes riots, then the psychology of young Europeans is not ready to begin the process of self-criticism and sacrifice.

Europe is on the precipice of doom. America, by contrast, has people who came here illegally *to work*, and still has an unemployment rate that Europe can only dream of. The biggest obstacle for the American people is internalizing what the difference between legal and illegal immigration is; hardly as insurmountable of a challenge as changing a society's entire attitude towards work, competition, entrepreneurship, and reproduction.

The Next Big Thing in Entertainment - Part I

The Futurist · 1 April 2006 · Archived copy · Original

Previously, I had written about **why the biggest technological changes take almost everyone by surprise**. Not many people recognize the exponential, accelerating nature of technological change, and fewer still have the vision to foresee how two seemingly unrelated trends could converge to create massive new industries and reconstruct popular culture.

Today, we will attempt to make just such a prediction.

Computer graphics and video games have improved in realism in direct accordance with **Moore's Law**. Check out the **images of video game progression** to absorb the magnitude of this trend. One can appreciate this further by merely comparing Pixar's Toy Story (1995) to their latest film, Cars (2006). But to merely project this one trend to predict that video games will have graphics that look as good as the real thing is an unimaginative plateau. Instead, let's take it further and predict :

Video Gaming (which will no longer be called this) will become a form of entertainment so widely and deeply enjoyed that it will reduce the time spent on watching network television to half of what it is today, by 2012.

Impossible, you say? How can this massive change happen in just 6 years? First, think of it in terms of 'Virtual Reality' (VR), rather than 'games'. Then, consider that :

1) Flat hi-def television sets that can bring out the full beauty of advanced graphics will become much cheaper and thinner, so hundreds of millions of people will have wall-mounted sets of 50 inches or greater for under \$1000 by 2012.



2) The handheld controllers that adults find inconvenient will be replaced by speech and motion recognition technology. The user experience will involve speaking to characters in the game, and sports simulations will involve playing baseball or tennis by physically moving one's hand. Eventually, entire bodysuits and goggles will be available for a fully immersive experience.

3) Creative talent is already migrating out the television industry and into video games, as is evident by the increase in story quality in games and the decline in the quality of television programs. This trend will continue, and result in games available for every genre of film. Network television has already been reduced to depending on a large proportion of low-budget 'reality shows' to sustain their cost-burdened business models.

4) Adult-themed entertainment has driven the market demand and development of many technologies, like the television, VCR, DVD player, and Internet. Gaming has been a notable exception, because the graphics have not been realistic enough to attract this audience, except for a few unusual games. However, as realism increases

through points 1) and 2), this vast new market opens up, which in turn pushes development. For the first time, there are **entire conferences** devoted to this application of VR technology. The catalyst that other technologies received is yet to stimulate gaming.

5) Older people are averse to games, as they did not have this form of entertainment when they were young. However, people born after 1970 have grown up with games, and thus still occasionally play them as adults. As the pre-game generation is replaced by those familiar with games, more VR tailored for older people will develop. While this demographic shift will not make a huge change by 2012, it is irreversibly pushing the market in this direction every year.



6) Online

multiplayer role-playing games are highly addictive, but already involve people buying and selling game items for real money, to the tune of a \$1.1 billion per year market. Highly skilled players already earn thousands of dollars per year this way, and with more participants joining through more advanced VR experiences described above, this will attract a sizable group of people who are able to earn a full-time living through these VR worlds. This will become a viable form of entrepreneurship, just like eBay and Google Ads support entrepreneurial ecosystems today.

There you have it, a convergence of multiple trends bringing a massive shift in how people spend their entertainment time by 2012, with television only watched for sports, documentaries, talk shows, and a few top programs.

The progress in gaming also affects the film industry, but in a very different way. The film industry will actually become greatly enhanced and democratized over the same period. For this, stay tuned for **Part II** tomorrow.

The Next Big Thing in Entertainment - Part II

The Futurist · 4 April 2006 · Archived copy · Original

Continuing from [Part I](#), where a case is made that the successor to video games, virtual reality, will draw half of all time currently spent on television viewership by 2012.

The film industry, on the other hand, has far less of a captive audience than television, and thus evolved to be much closer to a meritocracy. Independent films with low budgets can occasionally do as well as major studio productions, and substantial entrepreneurship is conducted towards such goals.



This is also a business model that continually absorbs new technology, and even has a category of films generated entirely through computer animation. A business such as [Pixar](#) could not have existed in the early 1990s, but from Toy Story (1995) onwards, Pixar has produced seven consecutive hits, and continues to generate visible increases in graphical sophistication with each film. At the same time, the tools that were once accessible only to Pixar-sized budgets are now starting to become available to small indie filmmakers.

Even while the factors in Part I will draw viewers away from mediocre films, video game development software itself can be modified and dubbed to make short films.



Off-the-shelf

software is already being used for this purpose, in an artform known as *machinima*. While most machinima films today appear amateurish and choppy, in just a few short years the technology will enable the creation of Toy Story calibre indie films.

By democratizing filmmaking, machina may effectively do to the film industry what blogs did to the mainstream media. In other words, a full-length feature film created by just 3 developers, at a cost of under \$30,000, could be quickly distributed over the Internet and gain popularity in direct proportion to its merit. Essentially, almost anyone with the patience, skill, and creativity can aspire to become a filmmaker, with very little financing required at all. This too, just like the blogosphere before it, will become a viable form of entrepreneurship, and create a new category of self-accomplished celebrities.

At the same time, machinima will find a complementary role to play among the big filmmakers as well, just as blogs are used for a similar purpose by news organizations today. Peter Jackson or Steven Spielberg could use machinima technology to slash special-effects costs from millions to mere thousands of dollars. Furthermore, since top films have corresponding games developed alongside them, machinima fits nicely in between as an opportunity for the fan community to create 'open source' scenes or side stories of the film. This helps the promotion and branding of the original film, and thus would be encouraged by the producer and studio.

Thousands of people will partake in the creation of machinima films by 2010, and by 2012 one of these films will be in the top 10 of all films created that year, in terms of the number of Google search links it generates. These machinima films will have the same effect on the film industry that the blogosphere has had on the mainstream media.

There you have it, the two big changes that will fundamentally overturn entertainment as we know it, while making it substantially more fun and participatory, in just 6 short years.

Europe is Giving Up on the Future

The Futurist · 11 April 2006 · Archived copy · Original

Two events on April 10, 2006 pushed continental Europe closer to the irreversible extinction of their civilization.

In France, a very modest law to let employers terminate underperforming employees before the age of 26 **was scrapped after socialists rioted in protest**. This could have been the first step in halting France's slide down the economic and demographic slippery slope they are on, but rioting socialists proved they can intimidate the government. No business started in France in the last 40 years is among France's 25 largest corporations. A culture of low birth rates, **aspirations of mediocrity**, and segregation of angry Islamic immigrants spells disaster for France before 2020.

In Italy, one of the last staunchly pro-US leaders in Europe, Silvio Berlusconi, may lose his bid for re-election. Italy, like France, also has a sluggish economy and birth rates far below replacement levels. His opponent, Romano Prodi, is bound to continue and even increase socialist practices such as 4-day workweeks.

The leftward shifts follow in the footsteps of Spain, which, in reaction to the **March 11, 2004 Madrid Train Bombings**, chose appeasement over counterattack, and voted out a pro-American government in favor of an anti-American socialist government. Predictably, Spain also has a sluggish economy, anti-business labor laws, and a severe shortage of new children being produced.

There are still small pockets of hope in Europe. Germany voted out anti-American Gerhard Schroeder and voted in pro-American reformist Angela Merkel. Denmark stood firm in the cartoon controversy. But these events, unless they cascade into much larger movements, are not enough to shift the center of gravity of European culture away from the path to demise. The hope some had for Europe to fight for their future fell into the abyss on April 10, 2006.

Remarkably, for the high opinions that many Europeans have of their culture, they have little interest in continuing that culture through producing new Europeans. When many Europeans are asked about this, they don't even want to think about it. Try a small experiment the next time you get a chance to ask this of anyone from continental Western Europe.

"In Europe, far fewer children are being produced to replace the existing population of Europeans, even while immigrant Muslims have many children. How can European civilization continue, under these circumstances?"

Try it, and see what happens. Notice how their answer will avoid the question posed and somehow deviate into a criticism of America. **Anti-Americanism is not merely their fashion**, but now a drug that they use to distract them from their self-inflicted troubles. The European Union, formed to be an economic counterweight to the US, **still produces just half of the new wealth that the US produces**, and has a growth rate much lower than the world average. By 2020, the EU will not even be a counterweight to China or India, let alone the US.

It is sad when a civilization with a rich history and culture stops making an effort to build a future. Perhaps, in a Darwinian sense, we are seeing evolution and extinction at work, where societies than **can't adapt to new realities are unable to take action to continue their survival**.

Cox and Forkum puts a thousand words in a picture.



The Housing Bubble - 20-Year Gains May Never be Repeated

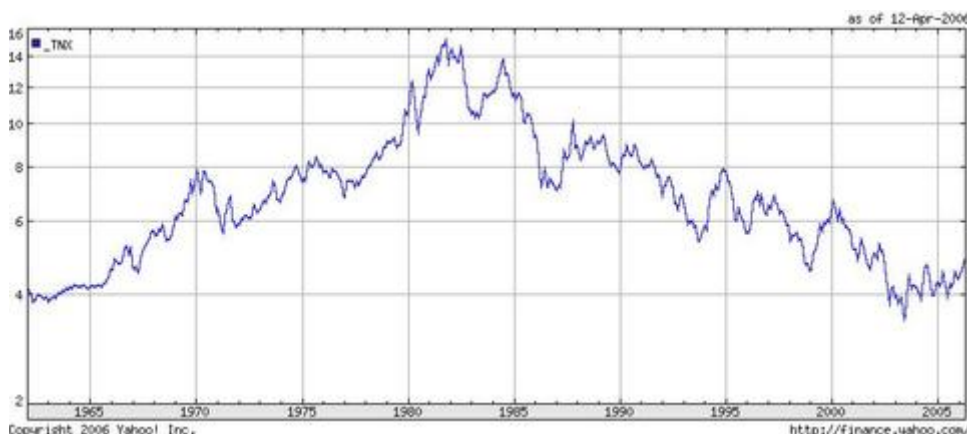
The Futurist · 13 April 2006 · Archived copy · Original

There are many reasons to believe that housing is in a bubble in many countries, and that in the US, residential real-estate in certain markets peaked in late 2005, and is now on the brink of a multi-year decline. This is a vast subject, but to summarize the main reasons to think this is a bubble are :

- 1) Interest Rates were at 46-year lows in 2002-04, which reduces mortgage payments for a given house, but inflates home values. This causes the ratio of home prices to salaries and home prices to rent to rise far above the trendline. At the same time, when interest rates rise (as they have since early 2005), home prices fall a couple years later as payments for a given home price rise and buyers are forced to adjust downwards.
- 2) Speculation is rampant, because the low interest rates from 2002-04 caused price increases of 15% a year to occur, and lead people to believe this is the normal trajectory of the trendline. This has tempted people to buy additional homes for investment, and happily accept the fact that rent income is much less than the mortgage payment, under the expectation that equity gains will offset the negative monthly cash flow.

Now, the bubble of the last 3-4 years was due to low interest rates at the front of the yield curve, which is something that the Federal Reserve controls, and which has given rise to new types of adjustable-rate mortgages that are advantageous only when short-term rates are very low. The rise of the Fed Funds Rate back to moderate levels guarantees a correction of the recent bubble, and is easily predictable.

However, there is another unrepeatable phenomenon residing beneath the first bubble, at the other end of the yield curve - the decline in long-term rates over the last 25 years.



The yield of the 10-year bond, which somewhat **correlates to 30-year mortgage rates**, peaked in the early 1980s and bottomed out in 2003. This long downward drift in mortgage rates generated upward movement on housing, and permitted housing to rise at a rate greater than nominal per capita GDP over this period. Even if someone purchased a house in the early 1990s, their mortgage rate was 10%, vs. just 6% in 2001 (before the recent bubble). This is the reason why the old rule of thumb of prospective homeowners being wise not to purchase a house priced more than 2.5 times their annual income was applicable in the 1970s and 1980s, but somehow gave way to home prices of 5-7 times income being considered normal. The hypothetical example below may help illustrate this phenomenon.

	Average Salary	Avg. Home Price	Mortgage Rate	Home Price/Salary
1985	\$30,000	\$75,000	12%	2.5
2005	\$80,000	\$400,000	6%	5

Now, the 10-year note yields (**and mortgage rates**) have begun to rise. While the rise has merely been by 1% so far, and even if rates never get that much higher than they are now, it is impossible for the drop in yield from 1981 to

2001 to be repeated. When the 10-year yield is 5% and mortgage rates are 6.5%, there is no room for them to drop another 3%. Theoretical 3% mortgage rates would result in homes being priced at 10 times average salaries nationwide, and even then have no further room for appreciation from that point. The floor has been hit, and there is nowhere else to go for further rate declines.

Thus, while the bubble created by low short-term rates from 2002-04 may dissipate in the next two years, after that, the next 20 years will additionally no longer have a tailwind of declining long-term rates behind housing, and the trendline of housing prices will be forced to converge towards mere increases in inflation and per-capita real GDP, or about 5% a year in the US. This is *after* the short-term bubble corrects.

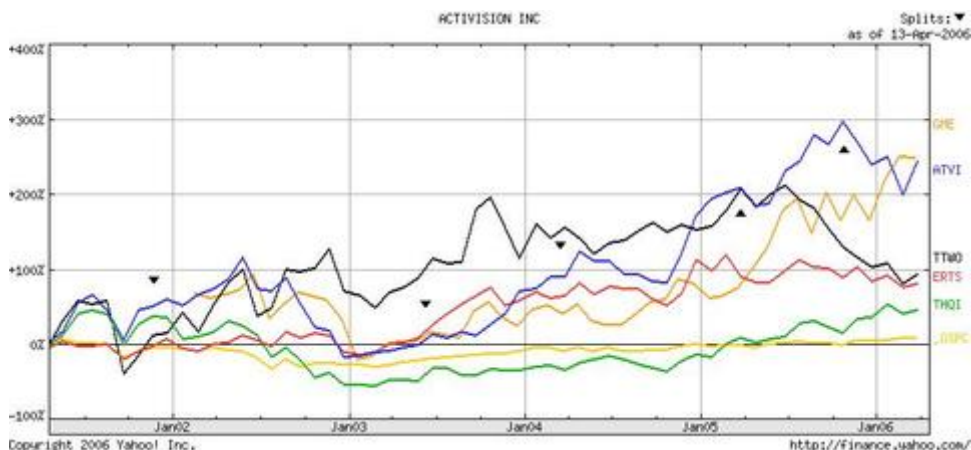
While I do believe that economic **growth rates are exponential and accelerating**, housing, being a product without a knowledge-based component, is less likely to participate in this accelerating curve. Increasingly greater returns will be seen in the stock market, and stocks, particularly those of knowledge-based businesses, will continue to draw capital away from real-estate, over the next 20 years.

The Next Big Thing in Entertainment - Part III

The Futurist · 17 April 2006 · Archived copy · Original

Here is a follow up to the two-part article, the [Next Big Thing in Entertainment](#), where a prediction is made that the video game industry will give rise to something much larger, that transforms many dimensions of entertainment entirely.

I feel one additional detail worth discussing is the performance of stocks that may do well from this phenomenon. A 5-year chart of four game development companies, Electronic Arts (ERTS), Activision (ATVI), Take-Two Interactive Software (TTWO), and THQ Inc. (THQI), plus retailer Gamestop (GME) provides an interesting picture.



All 5 companies appear to have greatly outperformed the S&P500 over the last 5 years, despite this being a poor period for technology stocks. Past performance is no indication of future returns, and it is difficult to predict with competitors will prevail over others, but a basket of stocks in this sector will be very interesting to watch for the next 6 years.

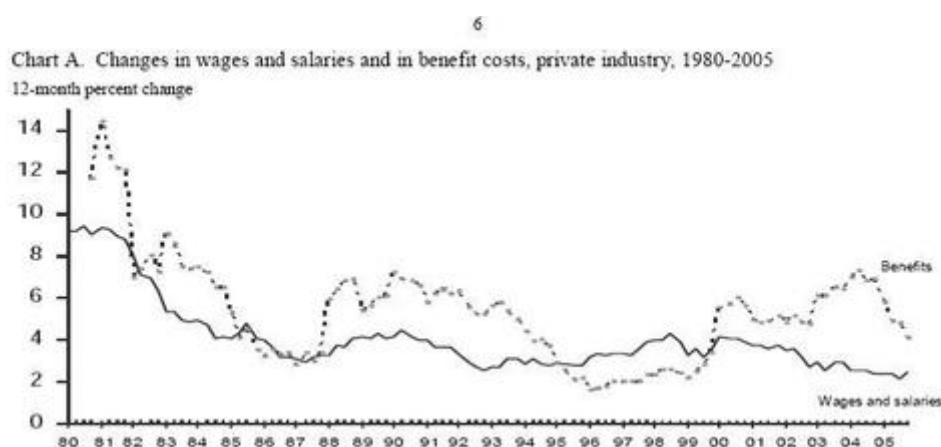
US Wages May Finally Rise, Through Biotechnology

The Futurist · 20 April 2006 · Archived copy · Original

For the last few years, despite robust GDP, productivity growth, and job creation, the average income of US workers has been rising at a very slow rate. Some of this was attributed to 'outsourcing', but this is not the case, as job creation would also have been weak, rather than just wage growth.

The reason for low wage growth has been healthcare costs greatly outpacing inflation during 2000-05. This consumes money that employers would have otherwise distributed towards employee salaries. Some of the rise in healthcare costs is due to an aging population, and some of this is due to the growing number of illegal immigrants not paying into a system they are using.

The chart below from the Bureau of Labor Statistics shows how the increased costs of benefits (mostly health insurance) has left little remaining money for salaries to rise. This is in sharp contrast to the late 1990s, when salaries could rise more rapidly due to subdued increases in healthcare costs.



In fact, the perception that the economy is weaker now relative to the late 1990s, despite nearly every economic indicator being comparable between the two periods, could be entirely due to this. People are getting weaker raises even when employers have increased spending on employees each year.

But we may be over the hump, as the data is finally trending in a favorable direction. [Michael Mandel's blog has observed](#) a decline in some of the technology-related components of healthcare costs. The costs of medical labs and imaging centers stopped rising altogether in the last year. Mandel says this may be due to competition, but I think this is due to technology. Not only are many advanced instruments subject to [The Impact of Computing](#), and thus improving in power and number every year, but new drugs and gene therapies provide treatment that sometimes avoids hospital stays altogether. Exponentially improving technologies are pervasively moving into medicine to deliver faster, cheaper, more effective treatments, and this saves money even for people who are not users of them.

If the moderation in the price of high-tech medical costs continues, US wages may rise as employers can pass more on towards salaries instead of health insurance premiums.

Related : [Are you prepared to live to be 100?](#)

Milli, Micro, Nano, Pico

The Futurist · 22 April 2006 · Archived copy · Original

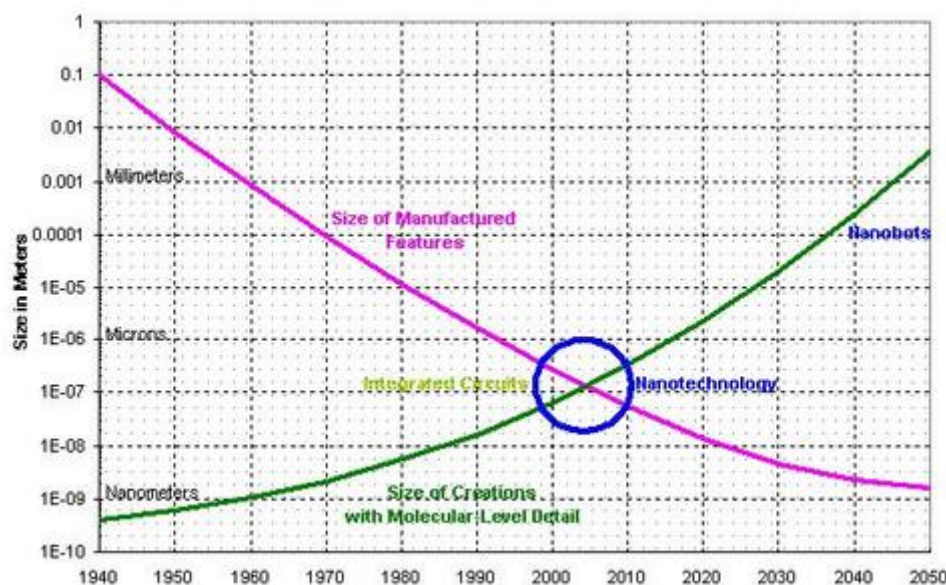
What would be the best way to measure, and predict, technological progress? One good observation has been **The Impact of Computing**, but why has computing occurred now, rather than a few decades earlier or later? Why is nanotechnology being talked about now, rather than much earlier or later?

Engineering has two dimensions of progress - the ability to engineer and manufacture designs at exponentially smaller scales, and the ability to engineer projects of exponentially larger complexity. In other words, progress occurs as we design in increasingly intricate detail, while simultaneously scaling this intricacy to larger sizes, and can mass produce these designs.

For thousands of years, the grandest projects involved huge bricks of stone (the Pyramids, medieval castles). The most intricate carvings by hand were on the scale of millimeters, but scaled only to the size of hand-carried artifacts. Eventually, devices such as wristwatches were invented, that had moving parts on a millimeter scale.

At the same time, engineering on a molecular level first started with the creation of simple compounds like Hydrochloric Acid, and over time graduated to complex chemicals, organic molecules, and advanced compounds used in industry and pharmaceuticals. We are currently able to engineer molecules that have tens of thousands of atoms within them, and this capability continues to get more advanced.

The chart below is a rough plot of the exponentially shrinking detail of designs which we can mass-produce (the pink line), and the increasingly larger atom-by-atom constructs that we can create (the green line). Integrated circuits became possible as the pink line got low enough in the 1970s and 80s, and life-saving new pharmaceuticals have emerged as the green line got to where it was in the 1990s and today. The two converge right about now, which is not some magical inflection point, but rather the true context in which to view the birth of nanotechnology.



As we move through the next decade, molecular engineering will be capable of producing compounds tens of times more complex than today, creating amazing new drugs, materials, and biotechnologies. Increasingly finer design and manufacturing capabilities will allow computer chips to accommodate 10 billion transistors in less than one square inch, and for billions of these to be produced. Nanotechnology will be the domain of all this and more, and while the beginnings may appear too small to notice to the untrained observer, the dual engineering trends of the past century and earlier converge to the conception of this era now.

Further into the future, molecule-sized intelligent robots will be able to gather and assemble into solid objects almost instantly, and move inside our body to monitor our health and fight pathogens without our noticing. Such nanobots will change our perception of physical form as we know it. Even later, picotechnology, or engineering on the scale of trillionths of a meter - that of subatomic particles - will be the frontier of mainstream consumer technology, in ways we cannot begin to imagine today. This may coincide with a **Technological Singularity** around the middle of the 21st century.

For now, though, we can sit back and watch the faint trickle of nanotechnology headlines, products, and wealth thicken and grow into a stream, then a river, and finally a massive ocean that deeply submerges our world in its influence.

\$70+/Barrel Oil, the Non-Crisis

The Futurist · 25 April 2006 · Archived copy · Original

Humans are not rational beings. This is evidenced by how much agony there is over having to pay \$500 more per year on gasoline than initially expected, against the relatively muted criticism towards real estate agents charging \$10,000 to \$60,000 for their services, or income tax preparation consuming over 10 hours of time per household per year (is 10 hours worth so much less than \$500)?

I have written before about why [\\$70/barrel oil is good for America](#), as it will accelerate technological progress in energy. [In fact, it already has begun to do this.](#)

But yet another interesting thought arises. Expensive oil affects the price of many things, as it inherently raises the cost of moving an object from one place to another. Corporations that need to do a lot of this, such as Wal-Mart, Federal Express, or United Airlines, see their costs rise, and have to both raise their prices and trim their staffing levels.

This seems like bad news for the US economy, until one considers the following :

Other countries also have such industries, and are also hit by higher oil prices. Countries that many fear will overtake the United States, such as India and China, have economies even more dependent on oil than the US. Sectors like automobiles, steel, aluminum, airlines, and concrete are actually growth industries in India and China, where the majority of people are yet to become consumers. If half of the people who have cars today did not have cars five years ago, then the increase in gasoline costs is a much larger percentage of their income than it is for an American. \$500 a year more for gasoline actually is a lot for those who make \$10,000 a year and just bought their very first car. Chinese and Indian consumer spending is much more sensitive to \$70 oil than US consumer spending is.

At the same time, US corporations such as Google, Yahoo, Goldman Sachs, Pixar, Citigroup, or Oracle are much less vulnerable to high oil prices. Yet, these knowledge-based businesses are the ones that have created most of the new wealth in the US during the last 25 years, and are the industries in which America's dominance over the rest of the world is the largest.

So in conclusion, high oil prices hurts some of our industries, but it hurts those industries in other countries to the same degree if not more, and the industries which are less affected by high oil prices are already the industries in which America is ridiculously far ahead of the rest of the world.

So high oil prices actually *increase* the gap between the US economy and those that would seek to catch up to it. If oil hits \$100/barrel, US GDP growth may drop from 3.5% to 2%, but China's GDP growth may drop from 10% to 4%.

Food for thought...

Virtual Worlds - BusinessWeek Catches On

The Futurist · 25 April 2006 · Archived copy · Original

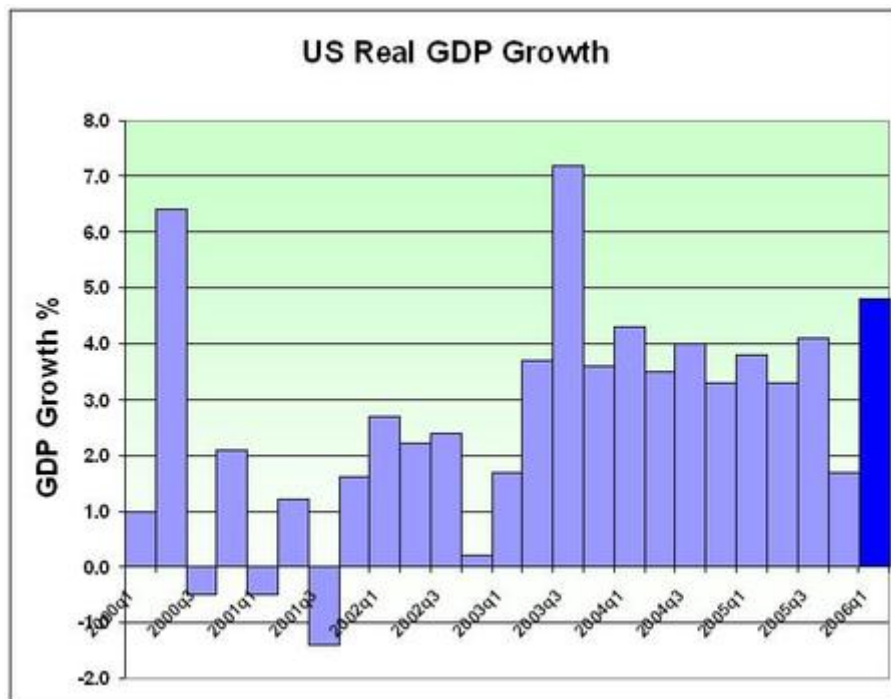
The **cover story of BusinessWeek** this week is devoted to virtual game worlds and the real economic opportunities that some entrepreneurs are finding in them.

I spoke of exactly this less than a month earlier, on April 1, about how video games would evolve into an all-encompassing next generation of entertainment to displace television, and also become a huge ecosystem for entrepreneurship. It seems that we are on the cusp of this vision becoming reality (**by 2012, as per my prediction**).

The US Economy grew 4.8% in Q1

The Futurist · 28 April 2006 · Archived copy · Original

US GDP grew at 4.8% in Q1, clocking the second-highest growth in any quarter in the last 5 years. This also made up for the weak growth in Q4 2005, and has ensured that the US economy remains on a trajectory of robust growth.



What is noteworthy is that this high growth has **continued despite high oil prices (where were in the \$60s per barrel in Q1)**, and despite the high trade deficit. In the late 1990s, despite inexpensive oil and a much smaller trade deficit, GDP growth rates were not much higher than what we have seen over the last 3 years. This shows of structurally sound the US economy is at the moment, and how it is growing at a rate much, much higher than the EU. The so-called 'oil-crisis' is a media circus, nothing more.

Related : **The World Economy Grew 4.3% in 2005.**

The Psychology of Economic Progress

The Futurist · 30 April 2006 · Archived copy · Original

The human brain may not have evolved significantly in the last 35,000 years, but the human mind has evolved greatly in just the last 200, in many parts of the world. This is apparent once we observe the world through Maslow's Hierarchy of Needs.

Abraham Maslow was an eminent psychologist in the 20th century who realized that the spectrum of human needs is more universally straightforward than it might appear, irrespective of culture. He constructed a hierarchy of human needs based on each level of prosperity and satisfaction, and the Maslow hierarchy became a foundation of modern psychology. He categorized each bracket of need-driven behavior as follows (sometimes, there are five levels).

1. Survival : The most basic human urge to survive is one where a person may disregard courtesy, culture, or religion in the pursuit of urgent necessities. An otherwise normal person may become unreasonable or even violent when his survival itself is uncertain. Animalistic behaviors may manifest themselves in the most desperate times.
2. Belonging : Once a human has progressed to a level where his most fundamental needs are no longer a cause of daily concern, then he seeks to be part of a community, whether it be his place of work or his social community. Harming another person to seize his possessions is no longer tempting or worthwhile.
3. Esteem : Once a person is secure in his career and community, and has progressed beyond the need to feel accepted by his friends or respected at his workplace, he strives to excel in multiple areas of his life. Building and maintaining an ego become the most important priority. Thinking of new ways to entertain himself is high on the priority list of the person at this level, and surplus money translates into materialism.
4. Self-Actualization : A person who has reached a level where his means greatly exceed his requirements of material contentment then may choose to focus his energies on activities that permit him to achieve his full potential. He is no longer concerned with pure material gain or enhancing the quality of his recreation, nor does he feel he needs to impress others beyond the extent that he already has. He seeks to become everything that he has the potential to become, and any time not spent pursuing this is treated as a waste. He seeks the company of other actualized people, and in such groups respect is gained from intellectual or artistic accomplishment.

In centuries past, killing another person in order to take his belongings was common. Today, the downside risk to one's career of even petty theft or minor fraud is enough that most people in the US today don't consider it. As the world economy accelerated from centuries of slow growth to a period of rapid growth starting from the middle of the 20th century, we have seen a general decline in violence and disorder in developed societies, and also a decline in large-scale warfare in general. Simply put, when more people have a stake in the stability and health of the system, they are more interested in maintaining and strengthening it, rather than disrupting it or trying to bypass it.

At the same time, a large segment of US society is stuck within the third level, esteem. The pursuit of fancier cars, bigger homes, and more material status symbols is seen as the ultimate achievement in life, through a belief that quality of life improves in direct proportion to the degree of conspicuous consumption. Relatively few have broken out of esteem and rise to actualization, the level where the great ideas that move humanity forward can emerge.

In the US, perhaps 3% still reside in survival, 65% in belonging, 30% in esteem, and just 2% in self-actualization. There is no country in the world with any more than a tiny minority attaining self-actualization yet, and such a nation would have to emerge in order to surpass the US in global power and influence. Similarly, some cultures make it difficult for individuals to rise out of survival or belonging at all, ensuring that some nations have systems that cannot reduce poverty or nurture knowledge-based businesses.

This is why globalization can benefit the world greatly. While anti-Americans deride the spread of American culture, this also means that people in cultures that inhibit upward psychological advancement are now presented with a guide on how to rise until esteem. The rapid growth in India and China, despite their cultures being heavily organized along belonging to a family and a community, has featured young people rising to embrace American-style esteem. Thus, massive reductions in both monetary and intellectual poverty are underway. At the same time, the complacent Americans stuck in esteem are forced to compete harder with India and China to prosper within globalization, which could induce more Americans to innovate their way to self-actualization.

As we evolve into an information economy, where more and more people are occupied in knowledge-based careers, self-actualization will be attainable for millions of people. Through actualization arises the greatest examples of social innovation, entrepreneurship, and charity, and these forces will be the key to creating the wondrous new technologies and robust economic growth that we expect in the 21st century.

This is a vast subject, on which more articles will follow.

Invite Illegals from Mexico to Join the US Military

The Futurist · 1 May 2006 · Archived copy · Original

Here's an idea : The Pentagon can offer a program where an aspiring young man (or woman) from Mexico or elsewhere can earn US citizenship by serving for 6 years in the US Military, provided their service is with honor. This is essentially a new class of visa, just like an H-1B, but is open to anyone who is young enough, able bodied enough, and determined enough to make this sacrifice to earn a US passport.

The military will have to start with a small intake for this program, and eventually build up the infrastucture and processes to take in a quota of around 200,000 a year. The US will have to organize bi-lingual officers (of which there are many) to manage these divisions of troops at first, and also organize some classes in which to teach them basic English as part of their basic training, but this is not too difficult. After these classes during basic training, however, these troops should be mixed among US born troops. Those who violate the military code of conduct should be discharged, and deported.

This is attractive for the illegal immigrants, because :

- 1) Being an enlisted soldier in the US military carries a salary of around \$20,000 a year, plus several benefits that continue after military service ends. It is a more attractive package than they are currently getting by doing unskilled manual labor in the US.
- 2) When they emerge as US citizens after their 6 years of service, they will know a fair amount of English, and will be able to get much better jobs in the US, than they could have gotten before their service. They could even go to college.
- 3) The soldiers that do well may choose to continue their military career path, and rise up to higher officer ranks over time.

This is very attractive for the United States, because :

- 1) It will be a way to separate out which illegals from Mexico truly want to become Americans and contribute positively to American society. This will be a structure through which they can learn English and assimilate in American society with honor. This may even lead to some of them going to college, and contributing to the US economy at a higher level.
- 2) It will be a way for the US to boost troop levels, in case a major military operation is upon the US in the future.
- 3) It will irritate the corrupt elite in Mexico, as the people who otherwise were a burden on the public services in the US will now be strengthening America, and may even gain the political clout to influence change in Mexico in the more distant future.
- 4) It will infuriate military-hating anti-Americans who deride this as a scheme to cultivate cannon fodder, even as Mexicans who participate will have done so by choice. The same anti-Americans who were previously advocates of unrestricted illegal immigration will now oppose this, and will alienate them from Mexicans who were previously easily manipulated by these extremists.

This program is far from perfect, and many more details have to be worked out. But among available options, this could be a very attractive one. At the very least, there should be a program where people who want to risk their lives for America can earn US citizenship through a clearly defined path. I suspect the number of people who sign up would be large.

Next-Generation Graphics - A Good Intro

The Futurist · 6 May 2006 · Archived copy · Original

IGN has a good article on what level of sophistication can be expected in video game graphics in the next couple of years. While their optimism about the period between now and 2008 is cautious, this reaffirms the technological trends and is consistent with my prediction that the descendants of modern video games will become the most popular form of home entertainment by 2012, mostly at the expense of television.

As always, viewing the pictorial history of video games gives an idea of the rate of progress that one can expect in the next decade.

More on the Decline of Europe

The Futurist · 7 May 2006 · Archived copy · Original

Joe Katzman at [Winds of Change](#) has an [amazing article](#) on the disastrous confluence of forces that have brought Europe to the precipice of disaster, and threaten to take the United States along the same path unless we learn from Europe's mistakes. Of particular note is the observation that a society is decadant when futility is accepted, and the absurd seems normal.

Related : [Europe is giving up on the future.](#)

Why the US Will Still be the Only Superpower in 2030

The Futurist · 17 May 2006 · Archived copy · Original



Version 2.0 of this article is posted [here](#).

One of the most popular dinner party conversation topics is the possibility that the United States will be joined or even surpassed as a superpower by another nation, such as China. China has some very smart people, a vast land area, and over four times the population of the US, so it should catch up easily, right? Let's assess the what makes a superpower, and what it would take for China to match the US on each pillar of superpowerdom.

A genuine superpower does not merely have military and political influence, but also must be at the top of the economic, scientific, and cultural pyramids. Thus, the Soviet Union was only a partial superpower, and the most recent genuine superpower before the United States was the British Empire.

To match the US by 2030, China would have to :



1) Have an economy near the size of the US economy. If the US grows by 3.5% a year for the next 25 years, it will be \$30 trillion in 2006 dollars by then. Note that this is a modest assumption for the US, given the accelerating nature of economic growth, but also note that world GDP only grows about 4% a year, and this might at most be 5% a year by 2030. China, with an economy of \$2.2 trillion in nominal (not PPP) terms, would have to grow at 12% a year for the next 25 years straight to achieve the same size, which is already faster than its current 9-10% rate, if even that can be sustained for so long (no country, let alone a large one, has grown at more than 8% over such a long period). In other words, the progress that the US economy would make from 1945 to 2030 (85 years) would have to be achieved by China in just the 25 years from 2005 to 2030. Even then, this is just the total GDP, not per capita GDP, which would still be merely a fourth of America's.



2) Create original consumer brands that are household names everywhere in the world

(including in America), such as Coca-Cola, Nike, McDonalds, Citigroup, Xerox, Microsoft, or Google. Europe and Japan have created a few brands in a few select industries, but China currently has none. Observing how many American brand logos have populated billboards and sporting events in developing nations over just the last 15 years, one might argue that US dominance has even increased by this measure.

[image]3) Have a military capable of waging wars anywhere in the globe (even if it does not actually wage any). Part of the opposition that anti-Americans have to the US wars in Afghanistan and Iraq is the envy arising from the US being the only country with the means to invade multiple medium-size countries in other continents and still sustain very few casualties. No other country currently is even near having the ability to project military power with such force *and* range. Mere nuclear weapons are no substitute for this. The inability of the rest of the world to do anything to halt genocide in Darfur is evidence of how such problems can only get addressed if and when America addresses them.



4) Have major universities that are household names, that many of the worlds top students aspire to attend. 17 of the world's top 20 universities are in the US. Until top students in Europe, India, and even the US are filling out an application for a Chinese university alongside those of Harvard, Stanford, MIT, or Cambridge, China is not going to match the US in the knowledge economy. This also represents the obstacles China has to overcome to successfully conduct impactful scientific research.

5) Attract the best and brightest to immigrate into China, where they can expect to live a good life in Chinese society. The US effectively receives a subsidy of \$100 to \$200 billion a year, as people educated at the expense of another nation immigrate here and promptly participate in the workforce. As smart as people within China are, unless they can attract non-Chinese talent that is otherwise going to the US, and even talented Americans, they will not have the same **intellectual and psychological cross-pollination, and hence miss out on those economic benefits**. The small matter of people not wanting to move into a country that is not a democracy also has to be resolved.



6) Become the nation that produces the new inventions and corporations that are adopted by the mass market into their daily lives. From the telephone and airplane over a century ago, America has been the engine of almost all technological progress. Despite the fears of innovation going overseas, the big new technologies and influential applications continue to emerge from companies headquartered in the United States. Just in the last two years, Google emerged as the next super-lucrative company (before eBay and Yahoo slightly earlier), and the American-dominated 'blogosphere' emerged as a powerful force of information and media.



7) Be the leader in **entertainment and culture**. China's film industry greatly lags India's,

let alone America's. We hear about piracy of American music and films in China, which tells us exactly what the world order is. When American teenagers are actively pirating music and movies made in China, only then will the US have been surpassed in this area. Take a moment to think how distant this scenario is from current reality.



8) Be the nation that engineers many of the greatest moments of human accomplishment. The USSR was ahead of the US in the space race at first, until President Kennedy decided in 1961 to put a man on the moon by 1969. While this mission initially seemed to be unnecessary and expensive, the optimism and pride brought to anti-Communist people worldwide was so inspirational that it accelerated many other forms of technological progress and brought economic growth to free-market countries. This **eventually led to a global exodus from socialism altogether**, as the pessimism necessary for socialism to exist became harder to enforce. People from many nations still feel pride from humanity having set foot on the Moon, something which America made possible.

China currently has plans to put a man on the moon by 2024. While being only the second country to achieve this would certainly be prestigious, it would still be 55 years after the United States achieved the same thing. That is not quite the trajectory it would take to approach the superpowerdom of the US by 2030. If China puts a man on Mars before the US, I may change my opinion on this point, but the odds of that happening are not high.

9) Be the nation expected to thanklessly use its own resources to solve many of the world's problems. If the US donates \$15 billion in aid to Africa, the first reaction from critics is that the US did not donate enough. On the other hand, few even consider asking China to donate aid to Africa. After the 2004 Indian Ocean tsunami, the fashionable question was why the US did not donate even more and sooner, rather than why China did not donate more, despite being geographically much closer. Ask yourself this - if an asteroid were on a collision course with the Earth, which country's technology would the world depend on to detect it, and then destroy or divert it? Until China is relied upon to an equal degree, it is not in the same league.



10) Adapt to the underappreciated burden of superpowerdom - the huge double standards that a benign superpower must withstand in that role. America is still condemned for slavery that ended 140 years ago, even by nations that have done far worse things more recently than that. Is China prepared to apologize for **Tianenmen Square**, the genocide in Tibet, the 30 million who perished during the Great Leap Forward, and the suppression of news about SARS, every day for the next century? Is China remotely prepared for being blamed for inaction towards genocide in Darfur while simultaneously being condemned for non-lethal prison abuse in a time of war against opponents who follow no rules of engagement? The amount of unfairness China would have to withstand to truly achieve political parity with America might be prohibitive given China's history over the last 60 years. Furthermore, China being held to the superpower standard would simultaneously reduce the burden that the US currently bears alone, allowing the US to operate with less opposition than it experiences today.



Of the ten points above, Europe and Japan have tried for decades, and have only achieved parity with the US on maybe two of these dimensions at most. China will surpass Europe and Japan by 2030 by achieving perhaps two or possibly even three out of these ten points, but attaining all ten is something I am willing to confidently bet against. The dream of **anti-Americans** who relish the prospect of any nation, even a non-democratic one, surpassing the US is still a very distant one.

A point that many bring up is that empires have always risen and fallen throughout history. This is partly true, but note that the Roman Empire lasted for over 1000 years after its peak. Also note that the British Empire never actually collapsed since Britain is still one of the the top seven countries in the world today, and the English language is the most widely spoken in the world. Britain was merely surpassed by its descendant, with whom it shares a symbiotic relationship. The US can expect the same if it is finally surpassed, at some point much later than 2030 and probably not before the **Technological Singularity**, which would make the debate moot.

That writing this article is even worthwhile is a tribute to how far China has come and how much it might achieve, but nonetheless, there is no other country that will be a superpower on par with the US by 2030. This is one of the safest predictions The Futurist can make.

The Nanotech Report 2006 - Key Findings

The Futurist · 30 May 2006 · Archived copy · Original

The **2006 edition of the Nanotech Report** from Lux Research was published recently. This is something I make a point to read every year, even if only a brief summary is available for free.

Some of the key findings that are noteworthy :

1) Nanotechnology R&D reached \$9.6 billion in 2005, up 10% from 2004. This is unremarkable when one considers that the world economy grew 7-8% in nominal terms in 2005, but upon closer examination of the subsets of R&D, corporate R&D and venture capital grew 18% in 2005 to hit \$5 billion. This means that many technologies are finally graduating from basic research laboratories and are being turned into products, and that investment in nanotechnology is now possible. **This also confirms my estimation that the inflection point of commercial nanotechnology was in 2005.**

2) Nanotechnology was incorporated in \$30 billion of manufactured goods in 2005 (mostly escaping notice). This is projected to reach \$2.6 trillion of manufactured goods by 2014, or a 64% annual growth rate. Products like inexpensive solar roof shingles, lighter yet stronger cars yielding 60 mpg, stain and crease resistant clothes, and thin high-definition displays will be common.

But a deeper concept worth internalizing is how an extension of the **Impact of Computing** will manifest itself. If the quality of nanotechnology per dollar increases at the same 58% annual rate as Moore's Law (a modest assumption), combining this qualitative improvement rate with a dollar growth of 64% a year yields an effective Impact of Nanotechnology of $(1.58) \times (1.64) = 160\%$ per year. As the base gets larger, this will become very visible.

3) Nanotech-enabled products on the market today command a price premium of 11% over traditional equivalents, even if the nanotechnology is not directly noticed.

The **next great technology boom** is upon us, **and it is beginning now.**

Nanotechnology to Create Plentiful Clean Water by 2015

The Futurist · 12 June 2006 · Archived copy · Original

An article from the [MIT Technology Review](#) describes a development by researchers at Lawrence Livermore National Laboratory that could bring clean drinking water to 2 billion people who currently don't have access to this necessity.

By using carbon nanotubes, membranes were created with pores so fine that only the width of seven water molecules could pass through. This removes many impurities, including salt molecules. These filters may reduce the cost of desalinification by up to 75%, and could come to market in the next decade. The real secret is the price of carbon nanotubes, which is expected to decline by half every 18 months. In 10 years, the price of nanotubes will be merely 1/100th of what it is today. This filter could become inexpensive enough for even small villages to operate their own desalinification facilities. This, in turn, could greatly reduce poverty, increase life expectancy, and foster economic growth.

Water is a critical component of economic growth on every level, even more so than oil. Numerous wars have been fought over water in the Middle East and North Africa, and this innovation could be yet another contributor towards the [reduction of warfare through economic prosperity](#).

Needless to say, a massive reduction in the cost of creating highly purified water also benefits the top of the economic pyramid. Industries that use large amounts of purified water and could benefit from cost reductions are semiconductors, pharmaceuticals, healthcare, food processing, etc.

Related : [The Nanotech Report 2006 - Key Findings](#)

The World Wealth Report, 2005

The Futurist · 25 June 2006 · Archived copy · Original

The annual **World Wealth Report from Capgemini**, which is a worldwide census of millionaires, was released this week. The report does not take inflation into account, using the threshold of \$1 Million each year. It also calculates net worth excluding primary residence, which can be misleading, as an American who withdraws \$300,000 in home equity from his primary residence would be recorded as immediately seeing a \$300,000 jump in net worth by merely this transferral of funds. However, the report still has many useful data points that present interesting trends.

Those with a net worth greater than \$1 million increased 6.5% in 2005 to reach 8.7 million in number. Among these, those with a net worth of \$30 million or greater increased at an even faster rate - 10% - to reach 85,600.

The variations in regional growth rates of millionaires **match the performances of those particular economies closely**. Within the global average millionaire growth rate of 6.5%, the United States was very close to the mean at 6.7%. Europe lagged by growing at only 4.5% and is rapidly shrinking its share of the world's millionaires, just as its share of world GDP simultaneously shrinks. At the other end of the scale, the surge in India is remarkable. The 19.3% growth of Indian millionaires in 2005 follows a 14% increase in 2004, for a two-year increase of 36%. South Korea, already as prosperous many European nations, saw a 21.3% increase in millionaires.

The aggregate wealth of millionaires reached \$33.3 trillion in 2005, an 8.5% increase from 2004, which itself was an 8.1% increase over 2003. That the trendline of annual asset growth appears to be above 8% shows us **how economic growth is exponential and accelerating**, as such rapid annual increases in wealth would have been unheard of just 50 years ago, let alone 200 years ago.

Making some modest assumptions for continued acceleration of exponential growth, we can expect the world to contain 18 million millionaires by 2015 and perhaps over 40 million by 2025. It is true that inflation should be considered as a factor, but the continuance of technology diffusion to the mass market should also be considered. In other words, many items available to even lower income people today, such as email, cellular phones, realistic video games, Yahoo! Maps, iPods, and Wikipedia, **were not available to even the wealthiest person just 30 years ago**. Similarly, even the wealthiest people today do not have many luxuries that the average person will have in 2015 and 2025.

As millionaire status becomes something achieved by an increasingly larger share of the population, the **psychology of wealth** will continue to transform the culture of broader society as well. More people moving up Maslow's hierarchy of needs will make a big difference on crime rates, the variety of recreational activities available, and **even the frequency of warfare**.

There is much to look forward to.

Related :

These are the Best of Times.

World GGP Grew by 4.3% in 2005.

The Psychology of Economic Progress.

Economic Growth is Exponential and Accelerating.

Oil Prices May Drop Soon, But This May Postpone Energy Innovation

The Futurist · 27 June 2006 · Archived copy · Original

There is an [article from Larry Kudlow today predicting a drop in oil prices in the near future](#). Kudlow's prediction is derived from economic data indicating higher oil supplies in the near future, an increase in exploration and drilling by oil companies, and new legislation favoring drilling. Given that Kudlow is usually right about most of his near-term economic predictions and points to several factors contributing to the possible drop, rather than just one, this could very well turn out to be accurate.

However, if prices were to return to lower levels, it is actually not very good for the United States in the long term. I believe that [\\$70/barrel for oil is the optimal price at which energy innovation can accelerate without tipping the US economy into recession](#). Technologies such as ethanol and tar-sand refineries become cost-effective when oil is above \$70, but if oil returns to lower prices, this innovation will stagnate once again.

A [chart of oil prices](#) (wikipedia) indicates that in the last 120 years, only for a 4-year period from 1977 to 1981 was the real price of oil higher than it is today. *Today's price is higher than it has been for 116 of the last 120 years.* While the 1977-81 price spike caused a painful recession, it fostered significant innovation in engine efficiency and alternative energy. As oil prices dropped and remained low during the 1980s and 90s, innovation slowed. Click on the chart to make it bigger.



The US economy will not be able to reduce our dependence on foreign oil, and significantly reduce the pollution of oil consumption, without a multi-year period of oil above \$70/barrel. This will be painful, but is the only way to enable the free market to achieve this necessary goal.

Related :

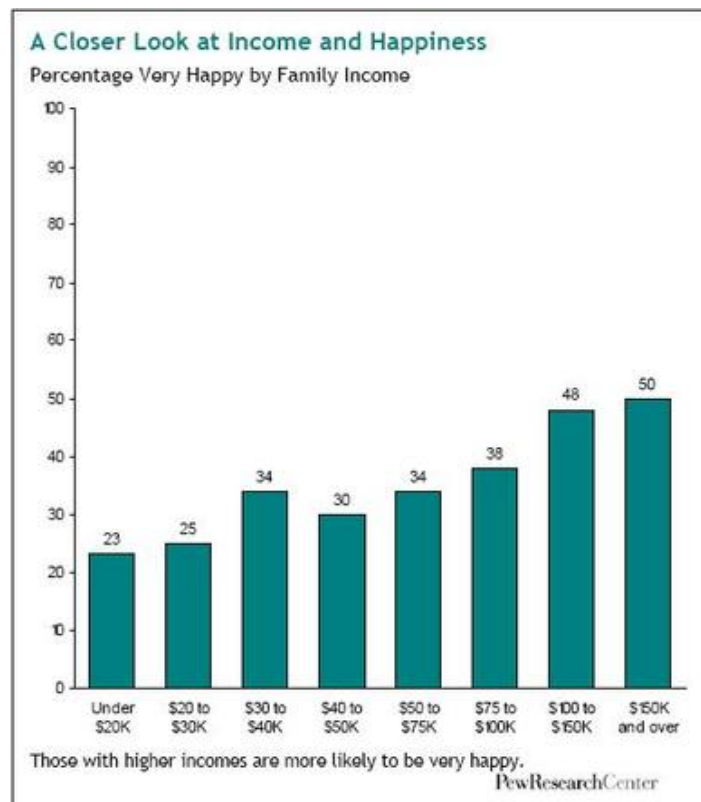
[\\$70+/barrel oil, the non-crisis.](#)

[The coming jump in energy technology.](#)

The Demographics of Happiness

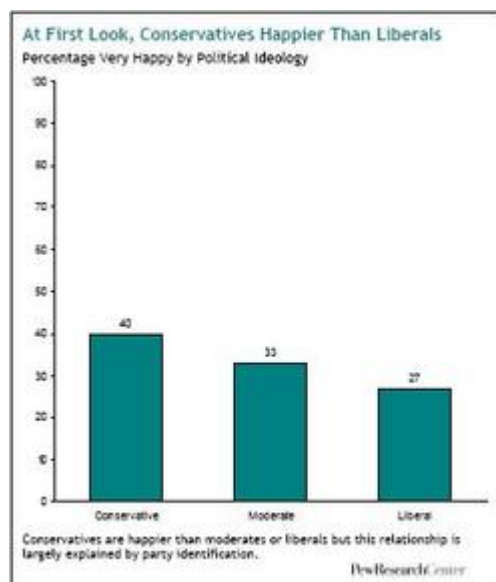
The Futurist · 3 July 2006 · Archived copy · Original

I happened to stumble across a [report from the Pew Research Center on the demographics of happiness](#). The report was interesting, but very little was actually surprising.



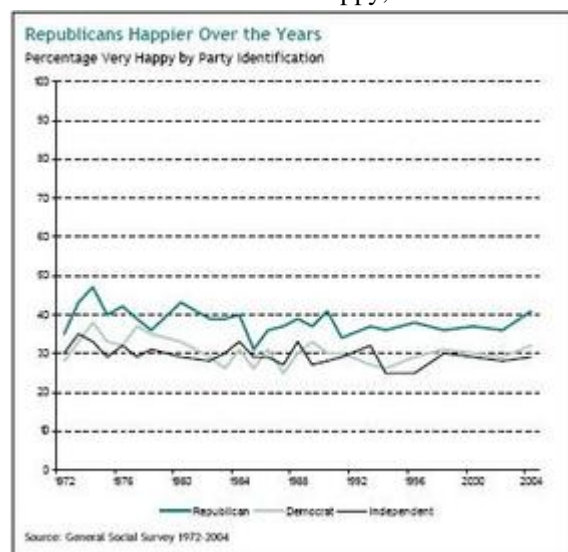
The report finds that income correlates to happiness, as having one's basic needs met can remove some of the most common causes of misery. However, the survey puts all making above \$150,000 a year into one bucket, thereby not providing any insight into whether there is incremental probability of happiness upon making \$300,000, \$500,000, or \$1 Million a year. I believe that it is quite possible that there is virtually no marginal increase in happiness beyond an income of, say, \$200,000 a year or so, because nearly all material needs are met at this threshold. Additional income can bring only more power, prestige, and fame, but material consumption and the resultant gratification saturates at this point. In other words, if someone making over \$200,000 a year is still not happy, it is probably for some reason other than money.

The next question that arises is that of relative vs. absolute wealth. If a person earns more than 95% of the members of his society, he is rich in whatever era he lives in, but [even a person of average income today has many technological luxuries that were unavailable to the wealthiest person 50 years ago](#). This, combined with [the rapidly growing ranks of the wealthy as a share of the total population](#) and [the tendency of prosperity to move people up the ranks of Maslow's Hierarchy of Needs](#), could lead to a very slow but steady migration of happiness away from increasingly accessible material consumption and towards more self-actualized forms of human fulfillment.



Beyond wealth, one's worldview has an influence on happiness. When happiness is categorized by political leanings, Republicans have had a stark advantage over Democrats for the last 35 years. This is even during the Clinton years, when Democrats had the most reasons to be cheerful than at any other time, and President Clinton himself had a contagious optimism that contributed towards high consumer confidence and a strong economy. The most obvious explanation for why 'liberals' are perpetually unhappy is that the realities of the real world continue to deliver outcomes contrary to what theoretical 'liberal' beliefs lead them to expect.

Additionally, one particular strain of 'liberalism' departed from the genuinely liberal goal of improving society, and mutated into a religion of hatred towards those who are happier than they are. 'Tax the Rich' might really be intended to mean 'Tax the Happy, because we are jealous of them'.



There was a time when the 'left' and 'right' merely disagreed on which approach was more suitable to cause improvements in society, as opposed to today when many on the 'left' have no interest in improving society at all, but merely feign altruism while engaging in a hateful campaign to obstruct or distort the pillars of traditional society from which most non-leftists derive happiness (such as marriage, faith, children, or entrepreneurship). This causes great conflict between their leftist religion and the natural urge of human decency still faintly present within them, and thus leaves them twisted and tortured in self-contradicting misery. The same is probably true of suicide bombers, for that matter.

Since happiness is a natural condition, present when natural needs are met, what does it tell us about which belief systems, activities, and behaviours are more 'naturally' suitable for human life?

The US Job Market is Booming, For Those Who Can Admit It

The Futurist · 8 July 2006 · Archived copy · Original

The US economy continues to glide along in an optimal 'goldilocks' trajectory. GDP growth, consumer confidence, service sector growth, and unemployment levels continue to proceed at robust, but not overheated levels.

The June unemployment report confirmed this. A quick glance at the historical unemployment rate from the [Bureau of Labor Statistics](#) shows that the current rate of 4.6% is lower than it has been for 32 of the last 35 years, the only period of lower unemployment being the bubble era of 1998-2000.



This also shows something else that is interesting. Let's examine the average unemployment rates over the last 14 years, during which there were two Presidents. For simplicity, we shall ignore the notion of inheriting an economy, whether good or bad, from one's predecessor.

Clinton : 5.3%

George W. Bush : 5.3%

So Clinton and GWB have had the same average unemployment rates during their terms, and only 3 of Clinton's 8 years had a lower rate than the 4.6% it is today. Imagine that.

People who suffer from Bush Derangement Syndrome just cannot accept that the economy could possibly be doing well. Their memorized arguments are :

- 1) They will say that those who have been unemployed for a long time are no longer collecting benefits and do not get reported in the statistics. This is untrue, as consumer confidence continues to be high.
- 2) They will say is that these jobs are all lower-skilled jobs that pay poorly. This directly contradicts their claims that all the gains of US economic growth gravitate to the top of the income ladder while the rest received no benefit. It also ignores the [basic statistic that average hourly earnings are, in fact, rising](#).
- 3) Their final argument will be that 150,000 jobs a month are needed to keep up with labor force growth. This is untrue, as the US workforce is 140 million people, growing at 1% a year, or 1.4 million new entrants a year. Divide this by 12, and it comes to 116,600 jobs needed per month to accommodate the new entrants. Furthermore, the US now has 1 million people who earn a living through entrepreneurial Internet activity, such as eBay trading, blogging, Google Ads, domain investing, etc. They are *not* captured in the traditional employment statistics. Ten years ago, these people would otherwise be working at traditional employers, but have voluntarily left the workforce. Soon, even video games may provide a viable form of self-employment for some people([see item 6 here](#)).

Behind this lies a deeper observation. The angry Left has so much cognitive dissonance about the fact that the economy is currently strong, that they are probably inhibiting their own chances of success in this economy. Their

pessimism leads to risk aversion, negativity, and other behaviors that preclude success. It also leads to a tortured logic that Bush supporters can be incredibly 'dumb' yet unfairly 'rich' at the same time.

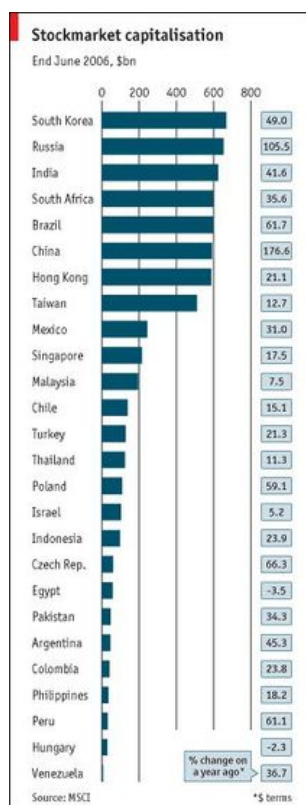
Here is an example of an extremist anti-Bush blogger, someone at least two standard deviations from the middle of political ideology, desperately trying to believe that the economy is doing poorly.

It is true that jobs continue to be lost at the bottom of the skill ladder (like in manufacturing), while a greater number of jobs are added at the top of the skill ladder. This is a boon for highly-educated workers, but a problem for workers with lower-level skills. Those who can upgrade their skills will prosper, and those that cannot will see declines in their standards of living.

This pattern of workforce evolution has been the norm for centuries, ever since Ned Ludd and his 'Luddite' followers destroyed cotton looms that put handweavers out of business. The accelerating rate of economic growth, however, now means that while a person could once spend their whole life at one skill level, they now have to continuously upgrade their skills every decade or so.

Stock Market Capitalization in Developing Countries

The Futurist · 19 July 2006 · Archived copy · Original



An interesting table in The Economist compared the market capitalizations of stock markets in developing nations. The first surprise is that the top seven stock markets are so close to each other in size. The next observation is that stock market capitalization has less to do with the GDP of the country than one would expect. China, which has the largest economy by far among countries on this list, has a smaller market cap than India or Russia. That Hong Kong and Taiwan approach China in size despite vastly smaller populations makes China look even more surprising. The large and wealthy diasporas of India and Han Chinese of Taiwan and Hong Kong are also a reason why these countries have market caps larger than their GDPs would suggest.

In any event, these numbers are dwarfed by the United States, which has a total stock market capitalization of \$20 Trillion, or 30 times greater than that of South Korea, India, or China. One company, General Electric, if placed on this list, would be between Taiwan and Mexico to take 9th place. And the US market cap grows at 8% a year (without assuming acceleration), which would bring it to \$130 Trillion by 2030. If China or India want to match the US market cap in size by 2030, that means they have to grow at 25% a year for the next 24 years straight.

This tells you how far any other country is from surpassing the US as an economic superpower. This will be worth visiting again when one of the countries above crosses \$5 Trillion.

Related :

[The Stock Market is Exponential and Accelerating](#)

[Why the US Will Still be the Only Superpower in 2030](#)

VietNam or Korea, which was better in the long run?

The Futurist · 23 July 2006 · Archived copy · Original

America fought two major conflicts in the second half of the 20th century, within the greater Cold War campaign. Both the **Korean War** and the **VietNam War** each resulted in over 50,000 US troop deaths and 2.4 million total deaths on both sides. The conventional wisdom in America is that VietNam was a 'failure' and Korea was a stalemate or even a success. However, both assessments may be untrue when viewing the long-term evolution of both theaters through to 2006.

To this day, the US and most of the world worries about North Korea, where a maniacal despot has attained nuclear weapons, and where human development is at African levels. North Korea is a nuclear-armed hypermilitarized prison camp, and a resolution to the current situation may yet prove even more costly than the first Korean War.

VietNam today is a rapidly modernizing nation with a GDP growth rate consistently in the 8% range. While it still is a communist state, it is not belligerent and it does not appear to be at risk of being headed by someone like Kim Jong Il.

The world is extremely fortunate that VietNam, with a population of 85 million, or 4 times that of North Korea, has not become a nuclear-armed state run by a despotic madman, 30 years after the fall of Saigon.

Think, for a moment, about how bad that would be.

In the context of whether the US should have fought either war, it is true that after the end of the Korean War, no further hostilities took place on the Korean Peninsula, whereas after the US withdrew from VietNam, 2 million more people will killed in Cambodia and Laos over the next 5 years. Yet, 31 years later, VietNam is relatively benign, and makes one wonder, in hindsight, whether the same would have happened anyway without US involvement. 53 years after the Korean War, the ripple effects of that are a danger to the world even today, and leads one to think, in hindsight, that the US should have pushed further, sustained more casualties, and unified the entire Korean Peninsula.

One more dimension about the Vietnam War merits consideration - the indirect role it had in turning China away from belligerency. **China invaded Vietnam in 1979**, possibly lured by the belief that VietNam was greatly depleted at the time. But the Vietnamese had learned many advanced military tactics after 13 years of fighting American forces. China lost 30,000 soldiers in just the first month of their incursion, after which the Chinese army hastily withdrew. Prior to 1979, China had conducted several acts of military aggression, including wars on the Korean Peninsula, the annexation of Tibet, a border war against India (1962), and against the Soviet Union (1969). But after 1979, the PRC has been substantially less willing to conduct expansionist aggression, with no comparable wars occurring since then. Perhaps the Sino-Vietnam War was what induced this change in the PRC's behavior.

Hindsight, of course, is 20/20, and is particularly malleable when given decades of time to look back upon. This is why any judgement on current US involvement in Iraq and Afghanistan will not be settled for quite some time, and those who are quick and eager to brand it a failure reveal a lack of knowledge of historical process (as well as simply fashionable anti-Americanism).

I believe **that the US will achieve a distinct victory in Iraq by 2008**. I also believe this will force many surrounding nations to change for the better. But the US should learn from the past and not let success in Afghanistan or Iraq lead to an incomplete job at the fringes, and the creation of another North Korea even despite the short term view of success. The plan has to be in the scope of decades, not just months or years.

Broadband Speeds of 50 Mbps for \$40/month by 2010

The Futurist · 28 July 2006 · Archived copy · Original

In 1999, maybe 50 million US households had dial-up Internet access at 56 kbps speeds. In 2006, there are 50 million Broadband subscribers, with 3-10 mbps speeds. This is roughly a 100X improvement in 7 years, causing a massive increase in the utility of the Internet over this period. The question is, can we get an additional 10X to 30X improvement in the next 4 years, to bring us the next generation of Internet functionality? Let's examine some new technological deployments in home Internet access.

Verizon's high-speed broadband service, known as FIOS, is currently available to about 3 million homes across the US, with downstream speeds of 5 Mbps available for \$39.95/month and higher speeds available for greater prices. How many people subscribe to this service out of the 3 million who have the option is not publicly disclosed.

However, Verizon will be upgrading to a more advanced fiber-to-the-home standard that will increase downstream speeds by 4X and upstream speeds by 8X. Verizon predicts that this upgrade will permit it to offer broadband service at 50 or even 100 Mbps to homes on its FIOS network. Furthermore, the number of homes with access to FIOS service will rise from the current 3 million to 6 million by the end of 2006.

Verizon's competitors will, of course, offer similar speeds and prices shortly thereafter.

The reason this is significant is that it falls precisely within the concept of the **Impact of Computing**. The speed of the Internet service increases by 4X to 8X, while the number of homes with access to it increases by 2X, for an effective 8X to 16X increase in **Impact**, and the associated effects on society. High-definition video streaming, video blogging, video wikis, and **advanced gaming** will all emerge as rapidly adopted new applications as a result.

We often hear about how Japan and South Korea already have 100 Mbps broadband service while the US languishes at 3-10 Mbps with little apparent progress. True, but Africa has vast natural resources and Taiwan, Israel, and Switzerland do not. Which countries make better use of the advantages available to them? In the same way, South Korea and Japan may have a lot of avid online gamers, but have not made use of their amazing high-speed infrastructure to create businesses in the last 2 years like Google Adwords, Zillow, MySpace, Wikipedia, etc. The US has spawned these powerful consumer technologies even with low broadband speeds, due to our innovation and fertile entrepreneurial climate that exceeds even that of advanced nations like Japan and South Korea. Just imagine the innovations that will emerge with the greatly enhanced bandwidth that will soon be available to US innovators.

Give the top 80 million American households and small businesses access to 50 Mbps Internet connections for \$40/month by 2010, and they will produce trillions of dollars of new wealth, guaranteed.

Related :

[The Next Big Thing in Entertainment](#)

[The Impact of Computing](#)

[Why Do The Biggest Technological Changes Take Almost Everyone By Surprise?](#)

[The End of Rabbit Ears, a Billion More Broadband Users](#)

Ultrasound Tourniquet May Greatly Reduce Troop Deaths

The Futurist · 28 July 2006 · Archived copy · Original

There was a time when America could wage wars and sustain 50,000 or more casualties without severe domestic opposition. Not any more, as even 2000 hostile deaths in Iraq has caused many Americans to be demoralized from the seemingly immense body count. Our technological and economic progress has caused our society to rightly place a premium on human life, but in order to preserve our society, we still need to wage brutal wars. Thus, market forces demand innovations that reduce US troop deaths even further.

Accordingly, the Pentagon has provided \$51 million for research towards the development of an ultrasound tourniquet that can stop the loss of blood from major wounds in as little as 30 seconds, and thus reduce troop deaths from guerilla/terrorist tactics (like those in Iraq) by over 50% by 2011 (Article : [MIT Technology Review](#)).

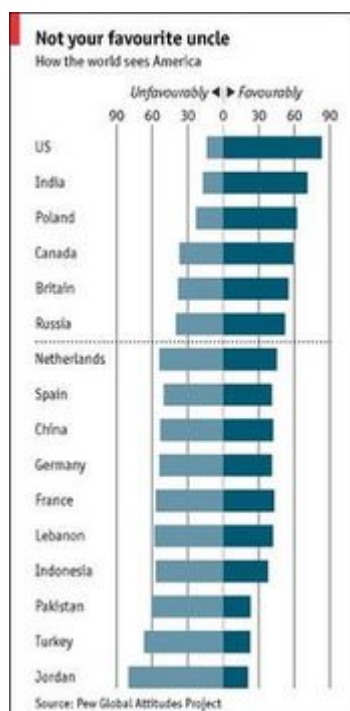
When the tourniquet is wrapped around a wounded limb or torso, it emits ultrasound beams that detect ruptured blood vessels and induce rapid clotting to seal them. This buys the wounded soldier enough time to be carried to an equipped medical facility, where previously he would often have died of blood loss before reaching the facility. Once at the emergency room, his chances of survival continue to be higher than before from targetted sealing of severed arteries and veins. Thus, the damage from all but the most severe wounds can be greatly reduced.

The implications of this are immense. In Iraq, the majority of US troop deaths are from improvised explosive devices (IEDs), where shrapnel often inflicts fatal wounds. Additionally, for each troop killed, eight are wounded. This device could reduce such deaths by half or more, and even help the wounded return to action in a much shorter time. At the same time, none of our opponents would have such a technology, further widening the power gap between an elite US force and a terrorist cell. Eventually, this could become a medical device available in hospitals for civilian use, reducing the deaths from automobile accidents and gunshot wounds significantly, provided an ambulance arrives in time.

Such a tourniquet will not be available to the US military in an easily usable form for another 5 years, but when it is, US military effectiveness in the War on Terror will be increased dramatically, as will the willingness of the US public to engage in continued military activity. When our troops become harder to kill from mere IEDs and gunshot wounds, non-uniformed terrorists and insurgents will be blunted even further.

Who Does America View Favorably?

The Futurist · 17 August 2006 · Archived copy · Original



Earlier, I had written an article titled [Who Hates America?](#), discussing how America is perceived by various countries, and then drawing correlations between the nature of these societies themselves and their likely opinion of American society. The chart of opinions on America constructed by the Pew Research Center is included again here for easy reference. This article continues to receive heated opinions on both sides of the debate across the blogosphere.

Now, I present the exact reverse of that article, in assessing how America perceives other countries in the world. [A survey conducted by Angus Reid Consultants](#) asks Americans if they feel the relationship the United States has with particular countries is favorable or not. Many of the same countries queried in the Pew survey are also queried here, allowing for easy cross-comparison. Anti-Americans will be irritated by the notion that Americans could even have the right to judge other countries, what with moral equivalence and all, which makes this examination even more worthwhile.

	Jun. 2006	Mar. 2006
England	76.0	76.4
Canada	71.4	70.9
Israel	62.9	61.8
India	54.8	52.1
Mexico	50.1	54.9
United Nations	50.1	50.6
France	44.5	45.0
Russia	44.3	47.1
China	41.6	41.5
Saudi Arabia	39.5	38.2
Venezuela	36.9	n.a.
Iraq	29.3	37.1
Palestinian Govt.	25.0	24.6
Cuba	24.4	27.2
North Korea	18.4	19.7
Iran	16.9	16.7

It seems that the countries that view America favorably have a strong correlation with those that Americans view favorably, and vice-versa, deepening the evidence that these opinions may be based on the same basic dimensions of innate psychological traits of cultures, and thus more deep-seated and well-informed rather than merely fashionable. Americans consider Britain to be their strongest ally. This is unsurprising, given Britain's near-unconditional support of US military efforts for the last century. Beyond this, other favorably viewed countries are fellow democratic, secular members of the Anglosphere like Canada and India. Given that India was the most pro-US country in the Pew survey, the jump in American favorable perceptions of India from 52.1% to 54.8% from just March to June 2006 indicates a warming of Indo-US ties in both directions. This is of massive significance on political, economic, military, and ideological levels. The large drop in how Mexico is perceived by Americans is also evidence of the Mexican government treating their practice of dumping their unwanted citizens into the US as an entitlement. The American people are that much closer to getting fed up with Mexico's abuse of America's accomodative stance, and they should be very careful about pushing the generosity of the American public too far.

Also unsurprising is that nations that view America unfavorably are also the ones that Americans view unfavorably. These tend to be communist countries, dictatorships, or terror-sponsoring rogue regimes. A core anti-American shibboleth is that 'the rest of the world hates America'. Indeed, the undemocratic regimes that the anti-Americans tacitly support do indicate this, but democratic, liberal societies do not. This complies with the anti-American opposition to the success of democracy in general throughout the world (siding with Hizbollah against Israel, Pakistan against India, North Vietnam against South Vietnam, etc.).

Remember, be judged by the character of those who like you, but also those who dislike you. By this measure, America's moral standing looks quite robust.

Terrorism, Oil, Globalization, and the Impact of Computing

The Futurist · 22 August 2006 · Archived copy · Original

Three things have happened in the last few years, which are now converging with a fourth inexorable trend to make major changes in consumer behaviour, mostly for the better.

1) September 11, 2001 showed the world the destruction that a small number of terrorists could cause by hijacking unsuspecting passenger planes. The subsequent increase in security almost did not stop **10 other UK to US flights from being exploded above the Atlantic by British-born terrorists disguising liquid bomb ingredients in soft-drink containers**. The terrorists will continue to get more and more creative, and will eventually destroy an airliner in an act of terror. This fear now hangs over all passengers. At the same time, security at airports is increasing pre-flight periods to up to 3 hours in duration. Multiply this by the millions of business passengers per year, and the loss of billions of dollars of productivity is apparent.

2) Oil at \$70/barrel is making air travel more expensive for cost-conscious businesses. **I happen to believe that \$70/barrel is the optimal price for oil for the US, where the economic drag is not enough to cause a recession, but the price is high enough for innovation in alternative energy technologies to accelerate**. Nonetheless, economic creative destruction always has casualties that have to make way for new businesses, and airlines might bear a large share of that burden.

3) At the same time, globalization has increased the volume and variety of business conducted between the US and Asia, as well as between other nations. More jobs involve international interaction, and frequent overseas travel. This demand directly clashes with the forced realities of items 1) and 2), creating a market demand for something to ease this conflicting pressure, which leads us to...

4) **The Impact of Computing**, which estimates that the increasing power and number of computing devices effectively leads to a combined gross impact that increases by approximately 78% a year. One manifestation of the Impact is the development of technologies like Webex, high-definition video conferencing over flat-panel displays, Skype, Google Earth, Wikimapia, etc. These are not only tools to empower individuals with capabilities that did not even exist a few years ago, but these capabilities are almost free. Furthermore, they exhibit noticeable improvements every year, rapidly increasing their popularity.

While the life blood of business is the firm handshake, face-to-face meeting, and slick presentation, the quadruple inflection point above might just permanently elevate the bar that determines which meetings warrant the risks, costs, and hassle of business travel when there are technologies that can enable many of the same interactions. While these technologies are only poor substitutes now, improved display quality, bandwidth, and software capabilities will greatly increase their utility.

The same can even apply to tourism. Google Earth and WikiMapia are very limited substitutes for traveling in person to a vacation locale. However, as these technologies continue to layer more detail onto the simulated Earth, combined with millions of attached photos, movies, and blogs inserted by readers into associated locations, a whole new dimension of tourism emerges.

Imagine if you have a desire to scale Mount Everest, or travel across the Sahara on a camel. You probably don't have the time, money, or risk tolerance to go and do something this exciting, but you can go to Google Earth or WikiMapia, and click on the numerous videos and blogs by people who actually *have* done these things. Choose whichever content suits you, from whichever blogger does the best job.

See through the eyes of someone kayaking along the coast of British Columbia, walking the length of the Great Wall of China, or spending a summer in Paris as an artist. The possibilities are endless once blogs, video, and Google Earth/WikiMapia merge. Will it be the same as being there yourself? No. Will it open up possibilities to people who could never manage to be there themselves, or behave in certain capacities if there? Absolutely.

Related :

The Next Big Thing in Entertainment

100 Mbps Broadband for \$40/month by 2010

Virtual Touch Brings VR Closer

The Futurist · 27 August 2006 · Archived copy · Original

Scientists have created a touch interface that, while smooth, can provide the user with a simulated sensation of a variety of surfaces, including that of a sharp blade or needle ([from MIT Technology Review](#)).

By controlling the direction in which pressure is applied to the skin when a user's finger is run across the smooth surface, the brain can be tricked into feeling a variety of pointed or textured objects where there are none. Essentially, this is the touch equivalent of an optical illusion.

While this technology is still in the earliest stages of laboratory testing, within 15 years, it will be commercially viable. By then, it will find many uses in medicine, defense, education, entertainment, and the arts. Examples of practical applications include training medical students in surgical techniques, or creating robots with hands that can perfectly duplicate human characteristics.

This will be one of the critical components of creating compelling and immersive virtual reality environments, and the progress of this technology between now and 2020 will enable prediction of the specific details and capabilities of virtual reality systems for consumers. A fully immersive VR environment available to the average household [has already been predicted here](#), and now one more key component appears to be well on track.

Update : [More from Businessweek](#)

The Imminent Revolution in Lighting, and Why it is More Important Than You Think

The Futurist · 5 September 2006 · Archived copy · Original

There are many technological revolutions of varying impact that we will see in the next decade, in fields ranging from **entertainment** to **automobiles** to **longevity** to **nanotech** to **telebusiness**. One of the largest revolutions, however, with the potential to improve fuel costs, electricity bills, greenhouse gas emissions, dependence on foreign oil, workplace productivity, and consumer confidence will happen where you least expect it - in the humble light fixtures of your home and workplace.



There are two technologies that have existed for decades, but are reaching cost and quality levels that can displace traditional incandescent lightbulbs. **Compact Fluorescent Lightbulbs** (CFLs) and **Light-Emitting Diodes** (LEDs) are both reaching prices of under \$2.50 each per unit. CFLs and LEDs not only consume only about 20% of the electricity of a traditional bulb, but can last up to 8 times as long, saving the time and hassle of 8 bulb purchases and replacements.

Of the 2 billion bulbs sold in the US each year, CFLs have jumped from just 1% of the total in 2000 to about 5% in 2005, or 100 million units. To accelerate adoption, Wal-Mart, often a critical catalyst for technology adoption, will start a major education and marketing campaign to sell another 100 million CFLs in the next 12 months.

Let's run some numbers to illuminate the magnitude of this.

The 110 million US households have an average of 20 incandescent bulbs in operation, each lasting a year on average (hence the 2 billion bulbs sold a year). If all 2.2 billion household bulbs are replaced with CFLs, the estimated 8-year average life of a CFL will ensure that replacement sales are only one-eighth of incandescent bulbs, or 250 million CFLs a year. Since a 60 Watt/hour incandescent can be replaced with a CFL that consumes only 15 Watt/hours of electricity, we can calculate :

If the typical household's 20 bulbs average 60 watts (.06 kWh) each and are used for an average of 4 hours a day each, and electricity costs 10 cents per kilowatt/hour, the household spends $(20 \times .06 \times 4 \times 365 \times \$1) = \$175.2$ a year. CFLs would save 75%, or \$131.4 in electricity costs for such a household each year. Since the electricity consumption curve is not linear and demand is somewhat inelastic, this benefits lower-income households greatly.

At the macro scale, if each of the 2.2 billion bulbs in operation in 110 million households is aggregated, they consume $(110m \times \$175.2) = \$19.3$ billion in electricity a year. CFLs would save 75% or \$14.5 billion for consumers per year.

But wait, it gets better.

In an age of fears about oil imports and atmospheric pollution, people are very wary of the amount of gasoline they consume, but usually have no idea how much oil and coal go into producing the electricity they use. A single 60 Watt bulb used 4 hours a day for a year requires the burning of about 70 pounds of coal. 2.2 billion incandescent

bulbs would require 77 million tons of coal per year, and CFLs could reduce 58 million tons out of that, or 6% of total US coal consumption. The emissions savings alone would be the equivalent of reducing US automobile driving by 15%, or about 25 million cars.

LEDs offer similar benefits in energy savings, and while they are not going to benefit from a push by Wal-Mart, are still a necessary presence as a rival technology to CFLs, each mutually forcing the other to keep up the rate of innovation. One of these two, if not both, will sweep across the world in the next 24 months.

Beyond the lighting revolution in the home, there is also one in the offering for the office, where tubelights, rather than bulbs, are currently used. This brings us to the third technology of this discussion.

A company called **Sunlight Direct** has a brilliant product that distributes sunlight indoors, no matter how far from a location is from a window. The solar lighting system consists of a roof-mounted 40-inch light-collecting disc that moves to follow the sun during the course of a day, and plastic fiber-optic cables that distribute the light throughout the interior of the building. After the costs of the initial installation, this will not only save businesses the cost of artificial lighting during the day, but will greatly increase the quality of life of employees who can be freed from their tubelit torture. Large retailers stand to save over 20 cents per square foot per year in electricity through the use of this system. Wal-Mart, for example, has about 3000 stores averaging 150,000 square feet each. This amounts to $(3000 \times 150,000 \times \$0.2) = \$90$ million in electricity potentially saved per year.



The product will be commercially available by 2007, with the possibility of a residential version by 2009. Of course, some geographies stand to benefit more than others, as we can see from this handy map of US solar energy intensity (from Wikipedia). But taking the marketing even further, we can note that some fast-emerging economies with acute energy shortages also have abundant sunlight, much greater than even in the Southwestern US. A product like Sunlight Direct's is very compelling in India, VietNam, Thailand, and Taiwan, where electricity costs are often much higher than in the US, but near-continuous tropical sunlight is the norm.

All three of these new technologies, and their descendants, will combine into a gale of creative destruction that will shake up a part of daily life that has been essentially unchanged for several decades. Unlike many other such disruptive technologies, the displacement and digestion process will be almost painless and nearly seamless. We all will be the richer for it.

Update (5/29/07) : [A CNet article has more details on various lighting technologies.](#)

The Blogosphere Will Now Save Billions in Taxpayer Money

The Futurist · 10 September 2006 · Archived copy · Original

Porkbusters, a blog founded by Glenn Reynolds and N.Z. Bear to expose wasteful government spending and organize opposition against it, has scored a major victory. **The Senate has unanimously (no Senator would dare oppose this) passed the Federal Funding Accountability and Transparency Act**, allowing itemized information on all federal spending to be publicly available.

Read the links for full details, but this is nothing short of a great coup for the American people, and for the blogosphere that empowered them. Many egregiously wasteful projects will be quickly detected, publicized, and effectively thwarted by bloggers from here on.

How much semi-corrupt wastage of taxpayer money is there? **From here**, we can see annual estimates of :

2004 : \$22.9 Billion

2005 : \$27.3 Billion

2006 : \$29 Billion

While all pork will not be eliminated, we can assume that for 2006, the \$29 Billion could have been trimmed down to \$9 Billion, with \$20 Billion in savings.

Just for fun, let's get carried away for a bit. I have some crazy ideas on what the federal government could be doing with \$20 Billion in taxpayer money per year.

1) Reduce the federal budget deficit. While I don't think the deficit is a ruinous problem due to it being no greater a percentage of GDP than it has been for most of the last 25 years, it would still be nice to reduce it from \$300 billion to \$280 billion with this spending reduction, and move closer towards future tax cuts.

2) An elite, specialized counterterror organization that effectively acts as a 'bodyguard force' for the public at potential terrorist targets. Rather than mere security guards or police officers, each of these agents would have the combined skills of intelligence officers, investigative agents, interrogation experts, and elite fighters. They would be trained to watch for suspicious behavior or body language to a greater degree than generic security guards, and be capable of conducting a rapid, penetrative interrogation on the spot.

To attract the best candidates, we would have to offer attractive compensation. If the salary, benefits, equipment, transportation, and administrative support of each agent amounted to a total of \$250,000 a year, we could use \$2 Billion a year to create a force of 8,000 of them. That would be enough to monitor every airline gate at the time of boarding, every entrance to every stadium during major sporting events, every convention center, every subway station, every skyscraper, every water supply, every nuclear plant, etc.

Critics would call this a dangerous step towards a police state, while others lament that this is what they had hoped the Department of Homeland Security would become. I'm sure that if this proposition were put on the ballot for a vote, it would get much more than 50% support. On a sheer financial basis, the 9/11/01 attacks cost the US economy anywhere from \$200 Billion to \$1 Trillion. This counterterror force would be effectively free, funded purely by a fraction of the money saved from pork elimination.

3) We could create a national scholarship program, or enhance existing ones, that create massive incentives for children to pursue study in science, engineering, and business. The simple approach would be the creation of a new program of \$100,000 scholarships awarded to promising high school seniors, to be applied towards four years of tuition, room, and board, for all science, engineering, and business students maintaining a 3.0 GPA at accredited undergraduate degree programs. Refining the selection criteria and process is the easy part. If 50,000 new students got this annually, it would still cost only \$5 Billion. But we can be far more creative than that.

One of the reasons that the proportion of high-school students indicating an interest in quantitative fields has declined is the 'nerdy' stigma associated with studying these subjects. Thus, the best return on investment would be a scholarship that induced cultural change in American teens, in addition to merely alleviating financial burdens. Hence, the scholarship could be buttressed with a carefully constructed marketing and media campaign to create social prestige associated with the scholarship.

The day on which scholarship awardees are revealed and notified by mail should be nationally announced to build suspense and chatter. Television commercials during programs with large teenage audiences indicating 'who will be next leaders of American ingenuity and industry?' would be run. The commercials would be designed to capture the imagination, such as depicting three high school friends who are awardees, and then jumping ahead to a reunion 30 years later, where one is a top executive, another is a Nobel Laureate scientist, and a third is an astronaut. Other commercials could show an unnoticed, studious boy suddenly becoming popular upon receiving such a prestigious scholarship. Such a marketing campaign could easily be run for under \$100 million a year.

If we assume another \$100 Million in administrative overhead, this whole program would cost just \$5.2 Billion a year.

4) Federal funding for basic and applied scientific research is where the next generation of technology and industry begins. However, it has a very uncertain return in terms of both timing and magnitude, and since it has few powerful lobbies advocating it, is often the first thing to be trimmed when belt-tightening ensues in Washington.

Total NSF funding appears to have increased from \$4.9 Billion in 1970 to \$60 Billion today, but it is actually constant at about 0.5% of GDP throughout this period. In an increasingly knowledge-based and technology driven world, keeping government research constant as a percentage of GDP is to let other nations close the scientific gap with the US. Adding \$20 Billion to NSF expenditures would increase the total budget by a third, and attract several thousand more students from abroad to pursue PhDs in the US, and stay here upon graduation. At worst, the additional research will merely not yield large benefits.

Anyway, dreaming of things that can improve our society is fun, even if they won't happen. Out of a \$2.8 Trillion federal budget in 2006, each of these programs is a pittance, and certainly not contingent on pork removal for financing. The total price of doing 2), 3), and 4) combined is just \$27.2 Billion. But they haven't happened, or at best, exist in only partial or diluted versions of what they could have been. Even the most creative country in the world is often not creative enough.

But it just shows how much can be done with the removal of some of the wasteful spending that was been occurring for so long. If only....

Google Earth Adding Immersive Travel Content

The Futurist · 13 September 2006 · Archived copy · Original

On August 22, 2006, I wrote an article titled '[Terrorism, Oil, Globalization, and the Impact of Computing](#)', in which I illustrate how four factors are converging to cause radical change in the nature of business travel and tourism. One paragraph in particular was :

Google Earth and WikiMapia are very limited substitutes for traveling in person to a vacation locale. However, as these technologies continue to layer more detail onto the simulated Earth, combined with millions of attached photos, movies, and blogs inserted by readers into associated locations, a whole new dimension of tourism emerges.

Sure enough, today we learn that [Google Earth is adding significantly more travelogue content](#) into its application, which can even include individual blogs and video clips. Users will continuously be contributing new content in a Wikipedia-like manner, as Google Earth and WikiMapia continually force mutual enhancement. Suddenly, the extent that you can experience a remote, exotic, or dangerous location has just increased substantially. It still does not replace being there, of course, but this is free of cost and of the hassles of going to an airport, flying, taking taxis, worrying about political correctness compromising airport security, etc.

Go on, and check out a place you are never likely to visit in person. Then tell us how it felt and if it was more fun than you initially expected.

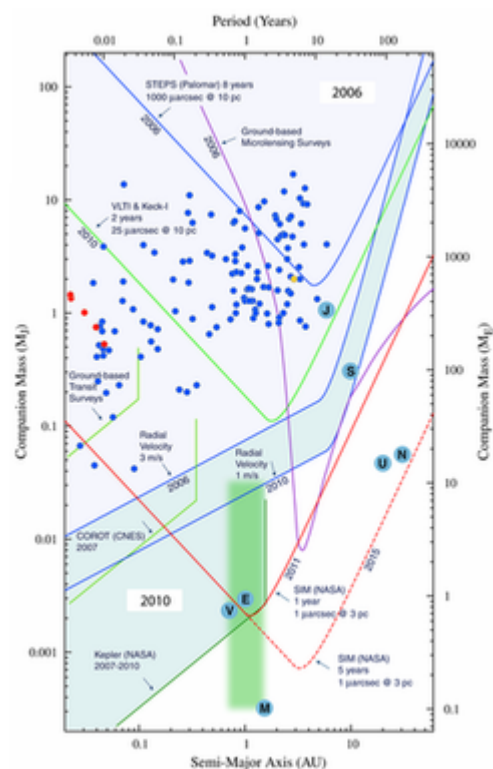
Telescope Power - Yet Another Accelerating Technology

The Futurist · 28 September 2006 · Archived copy · Original



Earlier, we had an article about [how our advancing capability to observe the universe would soon enable the detection of Earth-like planets in distant star systems](#). Today, I present a complementary article, in which we will examine the progression in telescopic power, why the rate of improvement is so much faster than it was just a few decades ago, and why amazing astronomical discoveries will be made much sooner than the public is prepared for.

The first telescope used for astronomical purposes was built by Galileo Galilei in 1609, after which he discovered the 4 large moons of Jupiter. The rings of Saturn were discovered by Christaan Huygens in 1655, with a telescope more powerful than Galileo's. Consider that the planet Uranus was not detected until 1781, and similar-sized Neptune was not until 1846. Pluto was not observed until 1930. That these discoveries were decades apart indicates what the rate of progress was in the 17th, 18th, 19th, and early 20th centuries.



The first extrasolar planet was not detected until 1995, but since then, hundreds more with varying characteristics have been found. In fact, some of the extrasolar planets detected are even the same size as Neptune. So while an object of Neptune's size in our own solar system (4 light-hours away) could remain undetected from Earth until 1846, we are now finding comparable bodies in star systems 100 light years away. This wonderful, if slightly outdated chart provides details of extrasolar planet discoveries.

The same goes for observing stars themselves. Many would be surprised to know that humanity had never observed

a star (other than the sun) as a disc rather than a mere point of light, until the **Hubble Space Telescope** imaged **Betelgeuse** in the mid 1990s. Since then, several other stars have been resolved into discs, with details of their surfaces now apparent.

So is there a way to string these historical examples into a trend that projects the future of what telescopes will be able to observe? The extrasolar planet chart above seems to suggest that in some cases, the next 5 years will have a 10x improvement in this particular capacity - a rate comparable to Moore's Law. But is this just a coincidence or is there some genuine influence exerted on modern telescopes by the **Impact of Computing**?

Many advanced telescopes, both orbital and ground-based, are in the works as we speak. Among them are the **Kepler Space Observatory**, the **James Webb Space Telescope**, and the **Giant Magellan Telescope**, which all will greatly exceed the power of current instruments. Slightly further in the future is the **Overwhelmingly Large Telescope (OWL)**. The OWL will have the ability to see celestial objects that are 1000 times as dim as what the Hubble Space Telescope (HST) can observe, and 5 trillion times as faint as what the naked eye can see. The HST launched in 1990, and the OWL is destined for completion around 2020 (for the moment, we shall ignore the fact that the OWL actually costs less than the HST). This improvement factor of 1000 over 30 years can be crudely annualized into a 26% compound growth rate. This is much slower than the rate suggested in the extrasolar planet chart, however, indicating that the rate of improvement in one aspect of astronomical observation does not automatically scale to others. Still, approximately 26% a year is hugely faster than progress was when it took 65 years after the discovery of Uranus to find Neptune, a body with half the brightness. 65 years for a doubling is a little over 1% a year improvement between 1781 and 1846. We have gone from having one major discovery per century to having multiple new discoveries per decade - that is quite an accelerating curve.

We can thus predict with considerable confidence that the first Earth-like planet will make headlines in 2010 or 2011, and by 2023, we will have discovered thousands of such planets. This means that by 2025, a very important question will receive considerable fuel on at least one side of the debate...

The Age of Democracy

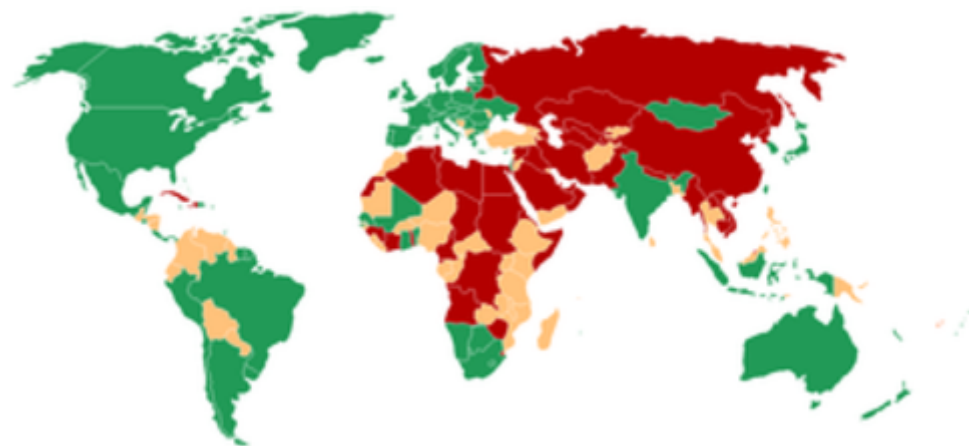
The Futurist · 30 September 2006 · Archived copy · Original

We often hear about how the US has no business spreading democracy to other nations by force, or how Islamic societies are not capable of functioning as liberal democracies. But how well do these conclusions stand up to the historical trends in the evolution of democracy?

First, consider that economic growth is exponential and accelerating, and the trendline of world economic growth is now close to 5% a year at Purchasing Power Parity.

Next, consider that conflict between nations drops as freedom and economic growth increases. No two nations that are both democracies and have per capita incomes greater than \$10,000 a year have ever gone to war with each other, and the number of countries meeting these two criteria continues to rise.

Lastly, let us measure the spread of democracy across the world in recent times. The map below is the result of research conducted by Freedom House (source : [Wikipedia](#)). Countries in green are free, yellow are partially free, and red are unfree.



From this, a few observations can be made :

- 1) The Western Hemisphere has done a much better job of establishing democracy than the Eastern Hemisphere, with 90% of Western Hemisphere residents living in green counties.
- 2) India is hugely important to any discussion of increasing democracy in the world, given its size and what it is surrounded by. The US would do well to cultivate broader ties with India as quickly as possible, and India would do well to cooperate rather than revert back to 'non-aligned' nonsense.

The next question is, is there a rate at which the nations of the world have evolved towards democracy? The same research from freedom house shows the growth in green countries at the expense of red countries from 1972 to today.



The march towards democracy appears to be quite solid, and includes such events as the collapse of the USSR and liberation of Eastern Europe. This chart unfortunately treats all countries equally, regardless of size, and thus does not take into account that Democracy in India is more valuable to the world than democracy in Estonia. Nonetheless, a population-weighted chart would still show a similarly rapid migration from red to yellow to green - 1 billion people have upgraded at least one level since 1972 alone.

The question now becomes, have the prospects for democracy saturated, where any nation that had the basic cultural foundations of democracy has already become one, and those without this foundation will take a very long time to adapt? Or is the trend we see in the chart still alive? To believe that the evolution of nations towards democracy will continue unabated, two things have to occur :

1) China will have to move from the red column to the yellow column. China is rapidly closing in on a GDP per capita greater than \$10,000 per year, and this has usually correlated to greater political freedom in most nations. **I believe China will make such reforms by 2015**, when they see that their robust economic growth has trouble advancing further without such freedoms. Such a change in China would move the entire center of gravity of the world's governments significantly towards freedom.

2) Afghanistan and Iraq will have to become genuine green countries. **There are many reasons to believe that this will be achieved in Iraq by 2008**. Anti-Americans, who are generally opposed to democracy, have attempted to sabotage these efforts, but have exhausted most of the tricks available to them. Once these two beacons of democracy are established, the rest of the region will have an open flank exposed to the winds of freedom.

These two events will trigger another wave of the democratic domino effect in countries throughout the continent of Asia. Many countries like Vietnam, Thailand, Pakistan, Malaysia, and Iran all have GDP growth rates greater than 6%, and in order to continue this growth, political freedom is a necessity that they will have eventually evolve towards. Catalysts like the two events above could be just the thing to move more reds to yellows and yellows to greens.

Related :

[The Winds of War, the Sands of Time](#)

[Economic Growth is Exponential and Accelerating](#)

[We Will Decisively Win in Iraq...in 2008](#)

The Lighting Revolution - An Update

The Futurist · 7 October 2006 · Archived copy · Original

On September 5, we had an article titled [The Imminent Revolution in Lighting, and Why it is More Important Than You Think](#), which described the massive change the economics of lighting will experience in the next few years.

I would like to also add this article from [MIT Technology Review](#), about advances in silicon-based white-light LEDs. The article explains how the low cost of silicon, combined with the massive infrastructure already in place to process silicon into electronic and solar-cell products, provides a catalyst for this innovation to reach mass-market adoption sooner than others. These LEDs could potentially use just one tenth the electricity of traditional incandescent bulbs, yet last 50 times longer.

The point that many miss, however, is not whether this technology supplants compact fluorescent bulbs (CFLs), or whether another form of LED technology wins out. The point is that there is rapid innovation in many unrelated technologies trying to address the same goal. This much competition and participation inevitably leads to high-impact innovations that benefit society immensely.

As stated before, [the energy problem will be killed by a thousand cuts](#), of which this is one.

New Nanosolution Can Block Bleeding and Reduce Troop Deaths

The Futurist · 14 October 2006 · Archived copy · Original

There was a time when America could wage wars and sustain 50,000 or more casualties without severe domestic opposition. Not any more, as even 2000 hostile deaths in Iraq has caused many Americans to be demoralized from the seemingly immense body count. Our technological and economic progress has caused our society to rightly place a premium on human life, but in order to preserve our society, we still need to wage brutal wars. Thus, market forces demand innovations that reduce US troop deaths even further.

On July 28, I had an article [about a new ultrasound tourniquet that could quickly inhibit bleeding even in the midst of a battle](#). Another innovation takes an entirely different approach to address the same problem. Scientists at MIT have developed a liquid that quickly self-assembles into a viscous gel that seals up severed blood vessels, when it comes in contact with a wound. Even better, the gel is biodegradable and does not have to be removed from the wound - it simply dissolves into amino acids. (Article : [MIT Technology Review](#)).

Active use by the military could be 8-10 years away. After that, it could be used by ambulances at traffic scenes or even during surgery.

But what is important is not whether this innovation, or the previously described ultrasound tourniquet, or some third technology wins out. What is important is that multiple unrelated technologies are rapidly closing in on a market need, forcing each of them to continually improve their efficacy and reduce their costs. This virtually ensures that the market need will be met in the near future.

Update (5/14/08) : [This is moving along more quickly than anticipated, and clinical trials are expected to start soon.](#)

Cisco's HD Video Conferencing System - A Predicted Innovation

The Futurist · 24 October 2006 · Archived copy · Original

On August 22, 2006, I wrote an article titled [Terrorism, Oil, Globalization, and the Impact of Computing](#). The article described how four seemingly unrelated forces had emerged in the last few years to create a quadruple inflection point that unleashed massive new market dynamics. Take a moment to go back and read that article.

Just 3 weeks later, [Google responded exactly to the market needs described in the article by adding immersive travel content into Google Earth](#), enabling users to have a moderately immersive experience of any location in the world, from the comfort of their own homes.

But the first article also described another segment of this market :

While the life blood of business is the firm handshake, face-to-face meeting, and slick presentation, the quadruple inflection point above might just permanently elevate the bar that determines which meetings warrant the risks, costs, and hassle of business travel when there are technologies that can enable many of the same interactions. While these technologies are only poor substitutes now, improved display quality, bandwidth, and software capabilities will greatly increase their utility.

And sure enough, on October 23, or just 2 months after the original article here on The Futurist, [Cisco has announced their 'TelePresence' HD video conferencing system](#), which is a huge advancement over contemporary videoconference technologies. It consists of three HD screens where conference participants are displayed in life-sized images.



While the optimal experience requires both parties to have the system, limiting the opportunities for its use in the near future, as more corporations adopt the system, using it becomes a routine practice in an increasing number of corporate settings. Corporations will be able to save a decent portion of time and cost of employee business travel, and redeploy those savings into R&D. Cisco itself expects to reduce business travel by 20%, saving \$100 million per year. If each of the [Fortune Global 500](#) corporations adopted it, they would save anywhere from \$20 to \$80 Billion per year.

The full system with three screens, cameras, and high-speed networking equipment costs \$300,000. However, almost all of the components of the system are full member technologies of the [Impact of Computing](#), and hence the same system is bound to cost under \$50,000 by 2011, and perhaps much less. Cisco expects the market to reach \$1 billion in annual revenue by 2011, which would amount to 20,000 units per year. Eventually, prices for a single screen version (currently \$80,000) might reach just \$2000 by 2015, making them common household items, allowing more people to work from home and untethering them from living in expensive geographies against their

preference.

Two substantial innovations from Google and Cisco have emerged in just two months since the original article. It is fascinating to watch the modern innovation economy adapt so rapidly to a new market need. There will be much more to marvel over in the coming months and years.

Update (2/20/07) : [A slideshow from BusinessWeek has more pictures.](#)

The US Economy Today - Amazing Resilience

The Futurist · 4 November 2006 · Archived copy · Original

Over the last 4 years, the US has averaged 3.5% annual GDP growth, which is exactly at the long-term trendline. **The unemployment rate is lower than it has been for 35 of the last 38 years**, with seven million jobs being created in the last 3 years alone. What is remarkable is that in this period, a number of factors that have caused recessions in the past have occurred, even as new negative forces have simultaneously emerged, and all these in tandem have not derailed economic growth. But does this mean we could be growing even faster, had these problems not emerged? Let us look at all the bullets that did not manage to do the damage that they once did, and the new bullets that we have successfully endured.

1) Terrorism and War : Depending on how one measures it, the Sept. 11, 2001 terrorist attacks cost the US economy anywhere from \$200 to \$800 billion. In addition, it worsened the recession on 2001-02, and still slows the productivity of the US economy through longer lines at airports, increased security expenditures, difficulties that law-abiding foreign tourists face in getting visas to enter the US (costing us over \$100 billion a year in tourist revenue), etc. This is effectively a new tax that we will be paying in perpetuity.

While the War on Terror has still cost the US just 3000 troops in 5 years (**vs. 50,000+ in VietNam and Korea**), the negative media coverage and resultant burden on the mood of the US consumer today may be comparable to what it was during the VietNam War. Add to that the threat that Americans could be killed in the US mainland when they least suspect it, and thus exists a lingering fear that makes consumer confidence lower than it should be.

2) Oil Spike : **When oil reached \$90 in today's dollars back in 1980**, this caused a very deep recession, even though prices quickly dropped after that. In 2006, oil reached \$78 per barrel before dropping, without causing a recession. In fact, it appears that sustained prices near \$60/barrel are not sufficient to cause a drag on the US economy. This is partly because of the US economy evolving to a state where a large portion of output is derived from innovation and technological advancement, which are much less tied to oil prices. An oil spike hurts GM and American Airlines much more so than it hurts Google and Microsoft.

Read : **\$70+/barrel oil, the non-crisis**.

3) Massive Natural Disaster : Hurricane Katrina was the largest natural disaster the US has been struck with in several decades, with the direct economic costs of a major city being submerged with water compounded by the displacement of hundreds of thousands of people and the economic activity they would otherwise generate. It cut the GDP growth of Q305 down to 1.8%. But in the next quarter, GDP bounced back smartly to 5.6%. The US economy adapted to the shock in a very short time.

4) Corporate Scandal Tax : While scandals like Enron and Worldcom could happen in any era, the resultant Sarbanes-Oxley (SOX) legislation has proven to be so oppressive to law-abiding corporations that the economic cost exceeds that of the implosion of Enron and Worldcom by a large margin. Medium-sized public companies have to pay an estimated \$3 million per year to comply with SOX, which is money that could otherwise go towards R&D, or be passed onto shareholders. Estimates of the total opportunity cost of SOX over the last 3 years run as high as \$1 trillion. Hopefully SOX can be scaled back for medium-sized enterprises with under \$1 billion in annual revenue.

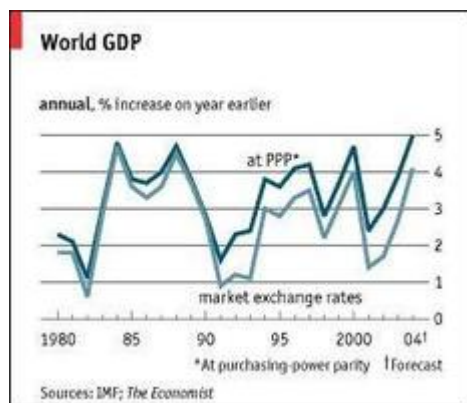
5) Trade Deficit : The US trade deficit, or the amount by which imports exceed exports, is not entirely a negative economic force, but it currently is over 5% of GDP, vs. just 2% of GDP in the mid-1990s. This reduces the total US GDP growth rate by over 1% a year.

I do not consider 'outsourcing' to be a negative for the US economy. I consider it to be a positive, **for reasons described here**.

Despite all these blows, the US economy has continued to grow at 3.5% for the last 3 years. It almost appears that the

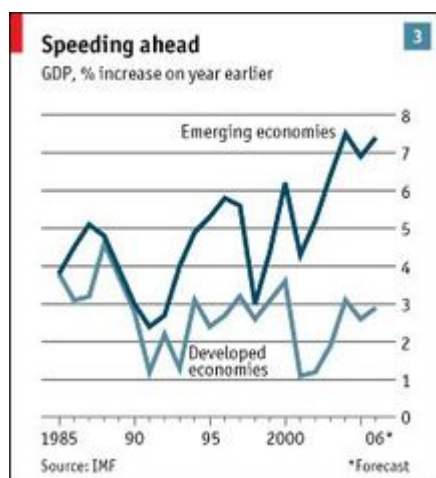
forces that would traditionally cause a recession are running out, with only three remaining :

- 1) A **Housing Bust** : The effect of this could be similar to the stock-market crash that contributed to the 2001 recession, but as the housing decline is already 1 year on, if a recession does not occur by the end of 2007, the US economy will have successfully digested this correction without a recession. This is a once-in-a-lifetime occurrence, just like the dot-com bubble was.
- 2) A terrorist attack larger than September 11, 2001. Of course, this may happen tomorrow, or may not happen for several years.
- 3) A pandemic like bird flu could cause tremendous economic damage, but the US would still be able to cope better than almost any other country in the world.



Even then, it sounds too good to be true that recessions will be increasingly less frequent in the future. But consider that **economic growth is exponential and accelerating**, permitting the trendline of economic growth rates to move increasingly higher. The number of quarters in which the US experiences negative continues to decrease as a percentage of all calendar quarters. But what if other parts of the world have accelerated even faster?

The trendline for World GDP growth is now at a robust 4.5% a year at PPP, and the world economy has not had a year of negative growth since 1973, with almost no year growing under 1% since 1983. A year with negative growth is so many standard deviations below the mean 4.5% trendline that the probability of it occurring in the next several years is mathematically small. In other words, the proportion of years in which world GDP growth is negative continues to decrease, and is asymptotically approaching zero. A global slowdown would still constitute growth of around 2% a year for a couple of years. Only a calamity such as a major bird-flu pandemic could cause a genuine recession for the world economy.



But this also means that while the US economy is growing at a strong rate relative to historical trends, it is actually lagging the world economy for the first time in several decades. If the US is chugging along at its long-term 3.5% trendline, the world is accelerating faster. In fact, developing regions by themselves are growing at nearly 7% a year. This graph shows how the developed world has remained steady (with

the US exceeding the growth rate of the rest of the developed world) even as developing regions have broken away.

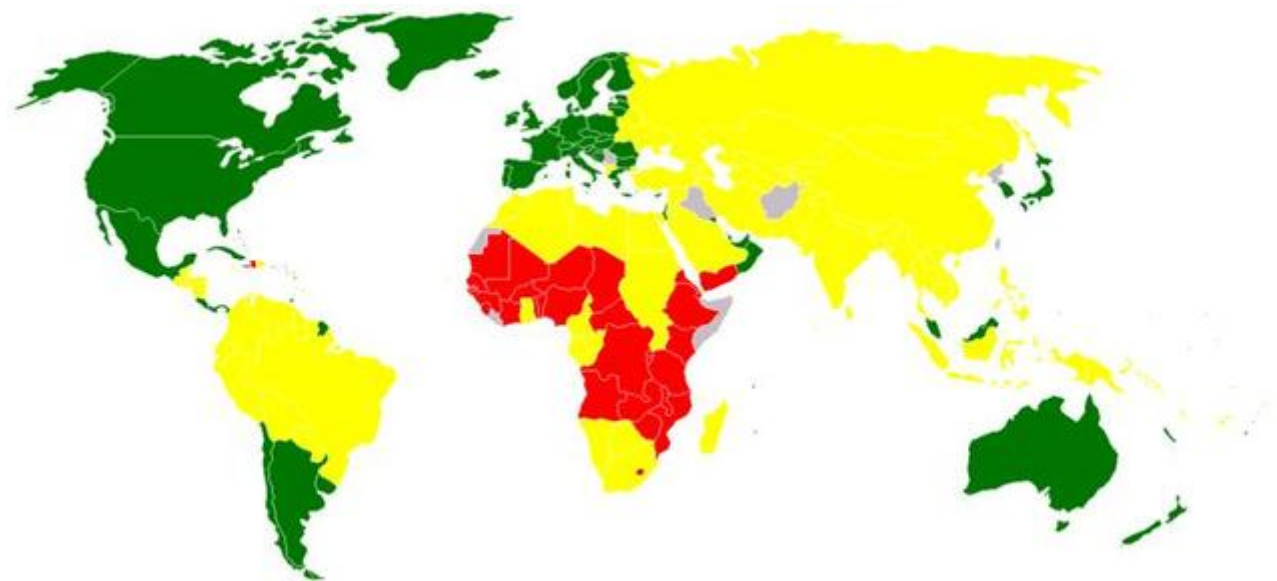
So in conclusion, the US economy is performing very well relative to historical norms, and this is even more remarkable given the many blows it has taken in recent years. But these blows have taken a toll - and the toll is that the US now lags the growth rate of the world economy by a significant margin.

New UN Human Development Data Released

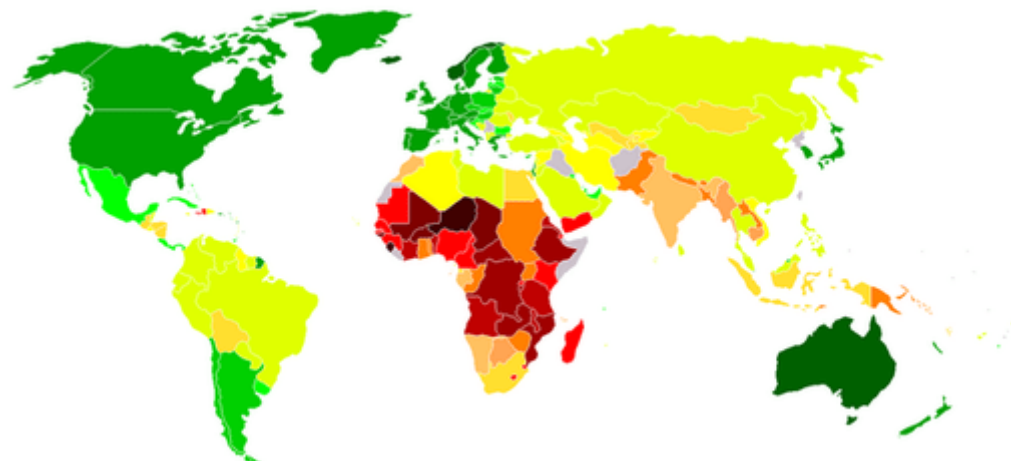
The Futurist · 15 November 2006 · Archived copy · Original

The UN has released **Human Development Data for 2004** (it usually lags by about 2 years). The changes per year are not large, but the website has added a new feature by which the Human Development Index (HDI) of a country can be graphed and compared to other regions of the world.

Currently, if the world is divided into three categories of human development (high, medium, and low), the distribution is as follows (from Wikipedia). The immediate observation is that outside of Africa, extreme poverty is a rare occurrence in the modern world.



The older 2003 data is divided into finer segments to provide greater precision :



Upon examination of the data by country, a few other points present themselves :

Only 20 countries had a score greater than 0.800 in 1975, but by 2004, 63 countries had crossed that barrier. This can be linked entirely to the diffusion of technology, spread of globalization, and the emergence of the United States as the dominant economic model in the world, creating win-win trade arrangements with many other countries. The progress in HDI across the world thus mirrors a **corresponding rise in democracy**, which I have argued has led to a **drop in warfare**.

Ireland used to be significantly behind Britain, France, and Germany, but has now overtaken them. Guess what

Ireland's tax rates are compared to those of the other three?

For all the media gloom about the US falling behind other countries, it **has been ahead of the composite average of OECD countries by about the same margin for the last 30 years. The US economic growth rate continues to be higher than the average for OECD nations.**

Mexico is considered to be a poor country, with a reputation for having citizens who seek to escape to the United States. However, it is still better off than most of the countries in the Eastern Hemisphere, including Russia and Saudi Arabia.

China will soon overtake **Russia**, which is still at a lower level than it was at in 1990. The rapid improvements in China have greatly reduced the total number of the world's people living in extreme poverty. Russia, on the other hand has been overtaken by at least 25 other countries over just the last 15 years.

Related :

[These Are The Best of Times](#)

[The Winds of War, the Sands of Time](#)

[Why the US Will Still be the Only Superpower in 2030](#)

[The Age of Democracy](#)

[Economic Growth is Exponential and Accelerating](#)

[The Biggest Event of the Last 15 Years : The Stunning Defeat of Socialism](#)

'Outsourcing' - What a Non-Crisis That Turned Out to Be

The Futurist · 26 November 2006 · Archived copy · Original

(Please see [Version 2.0](#), posted on March 18, 2008).

In the 2001-03 economic downturn, the aftermath of the technology bust resulted in hundreds of thousands of software engineers and assorted high-tech workers losing their jobs. A jittery public was vulnerable to influence from isolationist politicians, with the likes of Lou Dobbs and Pat Buchanan fanning the flames in the media. As a result, the simple business practice of moving certain components of daily operations to a lower-cost location, if only to keep up with competitors already doing the same, became a dirty word - 'outsourcing'.

The cover story of [Wired Magazine's February 2004 issue](#) was on the outsourcing of software jobs to India. Within the article, a core theme was the supposedly tremendous hardships that white-collar Americans were about to experience due to a 'giant sucking sound' of jobs going to India. In the same month, then Presidential candidate John Kerry screamed about the practices of "Benedict Arnold CEOs" who outsource American jobs to India, hoping to gain the support of isolationists and the economically ignorant. Elsewhere, *very* uncharitable things were said by leftists about brown-skinned Indians, due to their rapid adoption of capitalism and globalization at the expense of the leftist plantation where Indians were required to symbolize Gandhian non-violence, zen spirituality, yoga, curries, and the glorification of poverty.

Let's call February 2004 as time when fears of 'outsourcing' reached a fevered peak.

A quick glance at a few economic indicators from the [Bureau of Labor Statistics](#) since then reveals the following :

US Economy	February.04	October.06	Notes
Unemployment Rate	5.7%	4.4%	
Total US Jobs	130,475,000	135,844,000	5.4 Million jobs created
Hourly Wage	\$15.52	\$16.91	9% increase in 32 months

So 5.4 million jobs were created in this short time, [the unemployment rate is lower than it has been for 32 of the last 35 years](#), and wages have risen while real GDP has grown at a 3.5% clip. That has been the extent of the damage to the US economy. Take that, Lou Dobbs, Pat Buchanan, John Kerry, Dennis Kucinich, and other assorted demagogues, who have no ability whatsoever to truly grasp the trends that shape our world.

India, in the meantime, has benefited greatly as well. GDP growth has averaged 8% a year over this same period, and [political ties with the US have strengthened in a manner unlike](#) any previous period in the last 50 years, as evidenced by the [groundbreaking US-India nuclear deal](#), something that seemed unthinkable even as recently as 1998. [The faster these ties broaden, the better the world will become](#). A prosperous India is a critical component to the US achieving favorable outcomes in both the War on Terror and with China, [as seen from where India resides on this particular map](#). Anti-Americans become apoplectic when they learn that India is the most pro-US country in the world.

What does the future of outsourcing hold? Is there still a risk of jobs vanishing from the US at a rate faster than they can be produced, as pessimists still maintain? Unlikely, even though Internet backbone bandwidth has quadrupled in the last 3 years, and many more people in India have PCs and Broadband connections today than in 2003. This is because aggregate demand growth has saturated even India's vast labor pool. Salaries in India have been rising at over 12% a year due to labor shortages, causing their cost advantage to erode. India itself has started outsourcing to Bangladesh and Eastern Europe, which are much smaller labor pools and will also saturate quickly. If anything, the trends favor more job creation in America *and* India.

The next time there is a recession, this could emerge as a phony issue again. But other than a few pessimists, socialists, and racists, it is unlikely to gain much traction, as Americans have seen that the benefits have outweighed the costs by a handsome margin.

Update (4/24/07) : [BusinessWeek](#) also has an article on how misrepresented the outsourcing issue is.

nVidia Graphics Technology Advancement

The Futurist · 26 November 2006 · Archived copy · Original

Check out [nVidia's homepage](#) for a sample of the graphics that it's new graphics processors are capable of. Yes, that face is entirely computer generated, and can be rendered on a PC with nVidia's products available for a grand total of under \$2000. While this demonstration, of course, is constructed on optimal conditions to display pre-selected visuals for maximum 'Ooooh' effect, this will be the level of graphical detail that mainstream games will contain by 2012. [Our prediction of a radical reshaping of consumer entertainment appears to be on track.](#)

An important accomplishment of this demo is the apparent surmounting of the [Uncanny Valley](#) pitfall. More demos are needed to confirm that this obstacle has been overcome, however.

Related :

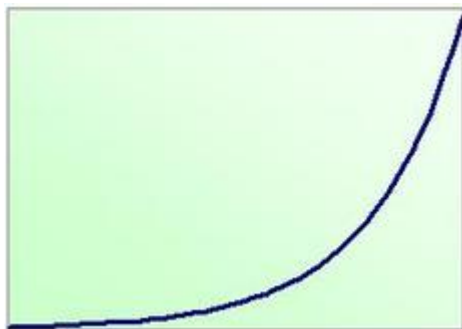
[The Technological Progress of Video Games](#)

[The Next Big Thing in Entertainment](#)

[Next Generation Graphics, a Good Intro](#)

Are You Acceleration Aware?

The Futurist · 3 December 2006 · Archived copy · Original



The single most necessary component of any attempt to make predictions about the future is a deep internalized understanding of the accelerating, exponential rate of change. So many supposed 'experts' merely project the rate of progress as a linear trend, or even worse, fail to recognize progress at all, and make predictions that end up being embarrassingly wrong.

For example, recall that in the early 1970s, everyone thought that by 2000, all of the Earth's oil would be used up. It has not, and the average American spends fewer hours of wages on gasoline each week than in 1970.

Equally simple-minded predictions are made today. How often do we read things like :

"By 2080, Social Security will no longer be able pay benefits, leaving many middle Americans with insufficient retirement funds."

2080?! By 2080, there will be no 'middle Americans'. There will be no people in their current form, as per their own choice, as we shall see later in this article.

Or how about this one? I see nonsense like this in Pat Buchanan's books.

"Immigration to the US from third-world countries will make such people a majority of the US population by 2100, making the US a third-world country."

'Third-world'? That term is already obsolete today as the Cold War has ended. Plus, aren't a lot of these same isolationists worried that India and China are overtaking us economically and benefiting from 'outsourcing' of US jobs? Isn't that mutually exclusive with a belief that the same countries will always be 'third-world'?

In any event, the world of 2100 will be more different from 2006 than 2006 is different from 8000 BC.

Here is why :

The rate of change in many aspects of human society, and even some aspects of all life on Earth, moves on an exponential trend, not a simple linear one.

Read Ray Kurzweil's [essay on this topic first](#). About 20% of his article is just too optimistic, but he does a good job of describing the evidence of accelerating change in multiple, unrelated areas. [The Wikipedia article](#) is also useful.

Additionally, right here on The Futurist, we have identified and discussed multiple accelerating trends across seemingly unrelated areas :

- 1) [The Impact of Computing](#) is a critically important concept, as it surrounds each of you in your homes every day. Observation of the new gadgets you are adopting into your life reveals many things about what the future may hold, as simple acts such as upgrading your cellphone and buying a new iPod hold much deeper long-term significance. This will cause major changes in [entertainment](#), [travel](#), [autos](#), and [business productivity](#) in the very near future.
- 2) [Economic growth is exponential and accelerating](#). World GDP grows at a trendline of 4.5% a year, as opposed to under 1% a year in the 18th century and under 0.1% a year before the 16th century. More visible evidence of

accelerating economic progress is found in long-term charts of the stock market. Furthermore, the number of millionaires in the world is rising by several percent each year. The ranks of the wealthy did not grow this rapidly even just a few decades ago.

3) Astronomical observation technology is also accelerating exponentially, which will result in the detection of Earth-like planets around other stars as soon as 2011. Transportation speeds also appear to be on an exponential curve of increase, even if significant jumps are decades apart. The cost to send a man to the Moon today in relation to US GDP is only 1/30th as much as it was in 1969.

4) Biotechnology is converging with information technology, and by some estimations medical knowledge is doubling every 8 years at this point. There is a lot of research underway that could directly or indirectly increase human life expectancy, which does appear to have been increasing at an accelerating rate throughout human history. But I am a bit more cautious to predict major gains here just yet, as each successive unit gain in lifespan might require increasingly greater research efforts. Negatives are also rising, as the dropping cost of small-scale biotech projects increase the ease at which small groups could create bioterror agents. The probability of a bioterror attack that kills over 1 million people before 2025 is very high.

5) Even energy has burst forth from what appeared to be a century of stagnation into an area of rapid technological advances. Beyond simple market forces like the price of oil, the revolutions in computing, biotechnology, and nanotechnology are all converging on the field of energy through multiple avenues to chip away at the seemingly gargantuan obstacles we face. Energy, too, is in the process of becoming a knowledge-based technology, and hence guaranteed to see accelerating exponential innovation.

The Milli, Micro, Nano, Pico curves are another dimension from which to view accelerating trends in an all-encompassing view. Internalize this chart, and much of the technological progress of the last 50 years seems natural, as do all of the future predictions here that may take most people by surprise.

Of course, not everything is accelerating. If a cat catches a bird, that action is no different today than it was 30, 3000, or 3 million years ago. The gestation period for a human is still 9 months, just as it was 30,000 years ago. The trends we have seen above do not appear to be on a path to change these natural processes. But don't assume that even these are permanently immune to change, as accelerating forces continue to swallow up more pieces of our world.

The Technological Singularity is defined as a time at which the rate of accelerating change increases to a point where it becomes human surpassing. To visualize what this can mean, ponder this chart, and then this chart. All credible futurists agree on such an event occurring, and differ only on predictions of the timing or nature of the Singularity. My own prediction is for 2050, but this is a vast subject that we will save for another day.

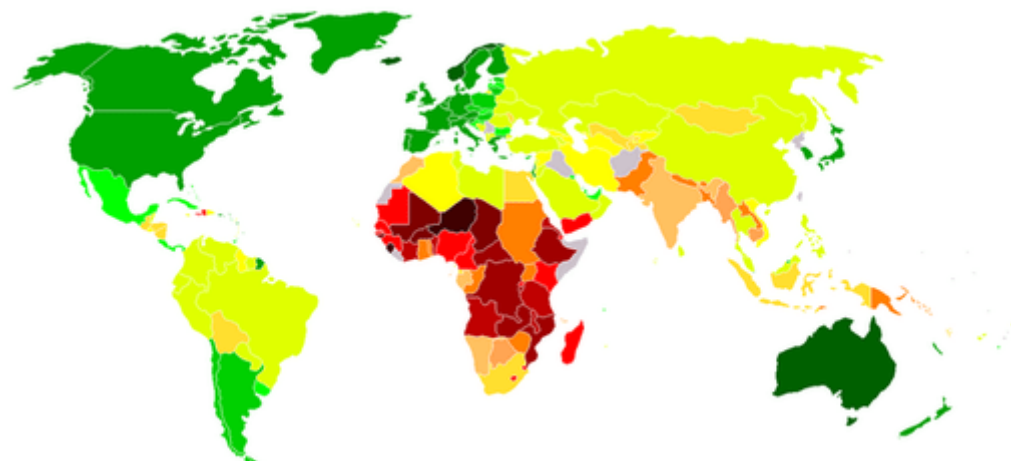
In any event, we need not worry just yet about whether the Singularity of 44 +/- 20 years hence will be a positive or a negative. Much more will be written about that in coming years, as many more people grasp the concept. For the present, just be observant of the accelerating trends that surround you, for the invisible forces that run the world gain much more clarity through that lens. There is much to gain by being acceleration aware..

The Culture of Success

The Futurist · 10 December 2006 · Archived copy · Original

This is going to be an article riddled with violations of 'political correctness'. As a result, we have an opportunity to think about a subject in an informative and unique context, two characteristics that 'political correctness' preclude.

First, let us put the United States aside for a moment, and look at the recent **Human Development Index map** :



The first question we can ask is why Australia and New Zealand are wealthy, while Haiti and Liberia are among the world's poorest. All four are countries that are inhabited and governed by people who have been there for under 200 years. Let me also provide the disclaimer that the reason is not because of the skin color of the inhabitants of those countries.

So why is the outcome of the two populations of African origin so incredibly worse than that of the two populations of Anglo-Saxon Protestant origin?

One word : Culture.

Cultures of specific ethnic groups are formed over the the course of centuries, not just decades. The early inhabitants of Australia and New Zealand (and Canada) were already conditioned with centuries of Anglo-Saxon Protestant culture, wherein the necessary ingredients of democracy, industry, and rule of law were already internalized. Hence, Australia, New Zealand, and Canada, despite being on separate paths for two centuries, still have produced remarkably similar outcomes. At the other end of the scale, Haiti gained independence in 1804, yet is still the only country in the Western Hemisphere with African levels of poverty - even Mexico is a paradise by comparison. Liberia is a country created for freed US slaves to return to in order to create a new home in Africa, with a constitution modeled off of the US constitution, and with ongoing benefits of US financial aid and mentorship. Nonetheless, Liberia is no more advanced than the traditional African countries that surround it. This leads to a conclusion that most sub-Saharan African cultures, over the course of centuries, never developed the intellectual or philosophical foundations of science, legal institutions, or productivity. Being separated from African society for two centuries is not sufficient to undo the millennia of anti-advancement conditioning that generations of people received in Africa, and hence the outcomes are still inevitably similar.

Ponder that for a moment, and then let us return to the United States.

Today, African-Americans in the United States have lower incomes than whites, even decades after the Civil Rights Movement and 140 years after the last slaves were freed. In 2006, **average annual household income for whites is \$49,000 while for African-Americans is just \$30,134**. It is true that institutionalized discrimination, segregation, and the forced separation of families are all sad chapters in the history of how African Americans were treated in the US. At the same time, they have received benefits like affirmative action, special scholarships, and other programs to help undo the damage previously inflicted upon them, and do have dominance in lucrative fields such

as sports and music. The examples of Australia, New Zealand, Canada, Haiti, Liberia, and Africa in general make it illogical to view the US as a microcosm, and the logical conclusion becomes that African-Americans still are within the partial clutches of African cultural traits that make economic advancement difficult. Centuries of life in the US have undone a portion of this, resulting in African Americans being far wealthier than blacks anywhere else in the world. However, it will still take a long time for them to fully gain economic parity with whites, in the US or in any other country in the world. The **accelerating rate of change** may help compress what would have previously taken centuries into mere decades, but the sheer enormity of the process of cultural transformation should not be underestimated.

Here is an article with more details on what cultural factors result in societal failure, and much of this can be seen in African societies.

Again, this has nothing to do with skin color, and there will be many individual exceptions to the majority. A black infant adopted by a Jewish or WASP family will achieve the same success as others of those groups, provided his childhood interactions are predominantly with others of his adoptive parents' ethnicity, rather than with poorer blacks.

Thus, the notion of 'racism' in the US is no longer an accurate one, and the concept of 'culturism' provides a better assessment of why income disparities exist between whites and blacks across and within dozens of nations today. The evidence is overwhelming, but discussion of culturism may also become a societal taboo.

But this concept is not complete without mention of the third type of culture that exists in the modern world : the Wheelbarrow cultures.

When using a wheelbarrow, a person can move greater weight than without the wheelbarrow. But when the person stops pushing it, the wheelbarrow cannot move at all. If a person were analogous to a wheelbarrow, such a person would be capable of greatness if guided by the right people, but would achieve nothing without such mentorship. This characteristic can even be seen in entire cultures.

India and China are countries that as recently as the 1970s, were just as poor as most African nations. At the same time, Indians and Chinese are the two wealthiest ethnic groups in the US, with an average educational level and household income substantially higher (greater than 1.5X) than that of whites. This is also true of Indian and Chinese communities in Britain and Australia. Even after adjusting for educational levels, the natural question arises about why India and China themselves are so poor despite the remarkable consistency with which their emigrants outperform the members of their new host countries.



It appears that Indians and Chinese often succeed in correlation to the quality of their surroundings. Speaking from direct experience, Indians tend to be people who are driven to do well when they feel they are guests in another country, and greatly fear the prospect of appearing unimpressive to non-Indians. The subconscious need to gain the approval of white people is very important to many Indians, and I suspect the same is true for many Chinese. When Indians are in India, on the other hand, they often default back to unsophisticated and unproductive habits, often with little interest in self-improvement or the betterment of Indian society. Leading Indian entrepreneur Kanwal Rekhi once said, "Indians are a first-rate people in a third-rate country. We compete with the best and brightest everywhere, but fail collectively."

Other examples abound. Countries like Taiwan, Hong Kong, and Singapore speeded ahead of the PRC in economic growth, despite having the same Han Chinese population, due to each having active American/British economic mentorship. The same can even be observed in North and South Korea, where the economic disparity between the two can be described as one group of wheelbarrows being successfully pushed by the US while the

other got no suitable mentorship, and thus remains Communist (a byproduct of wheelbarrows not being pushed by the right people).

This, therefore, brings us to the final concept of this treatise, which is the "Double Wheelbarrow Effect".

For a society with untapped wheelbarrow potential to achieve prosperity within the confines of its own culture, it becomes necessary to see examples of members of their culture doing well en masse. This permits traditional inferiority complexes vis-a-vis whites to vanish and permit previously disenfranchised people to gather the courage to ask "Why not us?". The prosperity of the first few wheelbarrows can then be multiplied. This can also be called 'globalization'.

Taiwan and Hong Kong were extremely poor in the 1950s, but rapid wheelbarrow-driven growth leading to prosperity by the 1980s, combined with the Chinese-American community in the US reaching critical mass around the same time, created an army of ethnic Chinese with the knowledge and skills to rapidly expand business ties with the PRC. So the former wheelbarrows themselves are now enabling mainland Chinese to achieve their full wheelbarrow potential. Hence, the rapid growth of the PRC became possible when it did, and the double-wheelbarrow growth is going strong even after 20 years.

India, unlike China, does not have the equivalent of Taiwan, Hong Kong, and Singapore where the wheelbarrow effect could begin 20 years prior due to Chinese seeing other Chinese attaining wealth, so India had to wait for the Indian community in the US (and to a lesser degree in the UK) to achieve critical mass and visible wheelbarrow maturity. This did not happen until the 2000s, and so the Double Wheelbarrow Effect could not benefit India until recently. Now, India is finally growing rapidly as US corporations open divisions in India and teach Indian workers about American corporate practices, which long ago had origins in Anglo-Protestant value systems. This Double Wheelbarrow education results in India being widely discussed in business magazines that just 10 years ago scarcely found any reasons to mention India.

In other words :

Step 1 : Indian engineer comes to US in late 1960s/1970s, gets job, feels xenophobic, but does well in career. Bonds with other Indians he would normally not be friends with in India.

Step 2 : He and his friends rise to senior management or start companies, and by the 2000s, are multimillionaires.

Step 3 : He helps his company start divisions in India, teaching Indians how productive businesses are run in America, what habits are good to develop and what traditional Indian practices should be jettisoned in the interest of producing something of value. He meanwhile teaches white American colleagues how many opportunities exist by using what India has to offer and persuades them to invest further.

Thus, the Double Wheelbarrow Effect is what is responsible for the rise of China starting in the 1980s and India starting in the 2000s. The conventional wisdom credits China's 1979 reforms and India's 1991 reforms, but those merely represent the locks being taken off the wheelbarrows. The actual pushing could only have happened when it did, not sooner, due to the need of the first diaspora wheelbarrows to achieve critical mass. But now, the double wheelbarrow tide is so strong that India and China are even devising ambitious space programs.

I'm going to give this subject a bit more thought and make some tweaks to the article (I, too, am a wheelbarrow). There is more to be done on this subject.

The US Must Act Quickly in Turkmenistan

The Futurist · 21 December 2006 · Archived copy · Original

The authoritarian dictator of Turkmenistan, **Saparmurat Niyazov**, passed away yesterday at the age of 66. Even by dictatorial standards, this man was eccentric. Among other things, he ordered the closure of all hospitals and libraries in rural parts of his country, reasoning that rural citizens were not worth the resources consumed. He also ordered the construction of an ice palace in his desert country, required that every clock have a picture of his face on it in order to force people to see his visage, and named the calendar months and days of the week after himself and his family.

But other than that, he was not exceptionally violent, and perhaps not as directly destructive to human life as Saddam Hussein or Pol Pot.

Niyazov did not arrange for a successor, and hence a leadership vacuum now exists in Turkmenistan. While this is a country of only 5 million people and a nominal GDP of only \$18 billion, it has a location of disproportionately high geopolitical importance. Just look where Turkmenistan is on the map.

Southwest Asia



Turkmenistan has just as long of a border with Iran as Iraq and Afghanistan each have, and is known for practicing a relatively moderate version of Islam (we don't see many terrorists of Turkmen origin). Even more importantly, Turkmenistan is the country with territory that is the closest to Tehran.

If the US were shrewd, we would heavily back the factions most likely to induce democratic reform in Turkmenistan, culminating in the ascension of a leader similar to **Hamid Karzai**. There isn't even the hindrance of a Taliban-type theocratic group as in pre-2001 Afghanistan. We would then encourage the formation of the same democratic institutions we have helped create in neighboring Afghanistan. After that, we could inject economic stimulus into the economy and rapidly modernize the infrastructure, so that Turkmenistan achieves **the 10%+ annual GDP growth that is currently in full flow in Afghanistan** (Turkmenistan already has 6.5% GDP growth). This would cost the US a pittance and not a single military casualty, and yet Iran would be even more tightly encircled by countries at varying stages in the process of forming democracies. Iran could, of course, send trouble across the border like it is doing in Iraq, but Iran's resources would then be even more thinly divided than they are

now. Iran would be drawn into yet another front in its proxy war against the US and Israel, and will be more prone to overplay its hand and do something that backfires.

If the US were shrewd...

The Tesla Roadster - A Glimmer of Energy Hope

The Futurist · 26 December 2006 · Archived copy · Original

Why would a car company want to operate out of Silicon Valley? For starters, consider that about 20% of a car's value is now comprised of electronic components, and this could reach 40% by 2015 - in true compliance with [The Impact of Computing](#). This is already greater than the dollar value of steel or rubber in the typical car, and signifies the gradual shift of yet another technology into an information technology.



Silicon Valley's first car company, [Tesla Motors](#), was founded in 2003. Their first product, the [Tesla Roadster](#), was unveiled in July 2006, and is a fully electric \$100,000 car that can accelerate from 0 to 60 mph in just 4 seconds. The cost of the electricity consumed is estimated to be as little as 1 cent per mile. Pre-ordered units will be delivered to customers in early 2008.

However, the initial Tesla Roadster is merely a symbolic product exercise for Tesla Motors. The real market-shaker is the subsequent 'White Star', a 4-door family sedan using the same electrical technology that could be released as early as 2009. It is expected to be priced at \$50,000 to \$70,000, and compete with BMW, Lexus, and Mercedes sedans. It is possible that by 2012-13, a 4-door sedan that reaches middle-class pricepoints could be available in substantial quantities, along with Tesla's service support infrastructure to go with it.

The benefits of a fully electric car that consumes just 1 cent of energy per mile are numerous, of course. From a decline in the quantity of oil imported from the Persian Gulf, to an increase in the purchasing power of the average American, to a contraction of the US Trade Deficit, to a reduction of atmospheric pollutants, there are many benefits to our society if this technology can scale into replacing a significant slice of US automobile sales by 2015.

[Tesla Motors has a blog with a lot of good information as well, including the rate at which they expect cost efficiencies to manifest themselves.](#)

Whether Tesla Motors succeeds in its long-term vision remains to be seen, but they have done well enough so far to merit watching closely.

Update (3/15/07) : [Tesla is opening 5 dealerships across the United States](#). Go see one, if you are in the same areas.

A Picture is Worth Several Thousand Words

The Futurist · 27 December 2006 · Archived copy · Original

(Scroll down to see the picture. This article is for comedic purposes only.)

I am going to interrupt my hiatus to present something that seems side-splittingly funny at first, yet frighteningly disturbing once one ponders what lies beneath the surface.

Tammy Bruce wrote an article in 2005 noting how the intellectual rot of the Leftist ideology has mirrored a deterioration in the physical appearance of Left-wing ideologues. Bruce makes the case that as the Left degenerated away from a goal of seeking solutions to improve people's lives and towards a militant hatred of anything that does not conform to an increasingly rigid cult, this sordid mentality led to visible declines and even mutations in physical appearance.

One cannot help but contemplate the literary works that examine certain variations of this theme :

- 1) *The Time Machine* by H.G. Wells, where, in the distant future, the human race has split into two branches - the beautiful, sun-loving Eloi, and the insectoid, subterranean Morlocks. It is revealed that the Morlocks harvest the Eloi for food.
- 2) *The Picture of Dorian Gray* by Oscar Wilde, where a young man is able to remain immortally handsome while a picture of him grows increasingly ugly with each sin he commits.
- 3) *The Lord of the Rings* by J.R.R. Tolkien, where the Orcs, Urug-Hai, and Trolls of Mordor are allegories of expansionist totalitarianism. Orcs and Urug-Hai are 'manufactured' in underground factories, as there are no female Orcs. Orcs create nothing of beauty, instead seeking only the destruction of others.

In viewing the contrasting collections below, the sheer magnitude of the chasm is striking. Even if one were to adjust for the difference in median age between the two groups, the gap merely shrinks from colossal to gigantic (the median age of the Right-Wing group nonetheless exceeds 40).

Perhaps this is a visible example of Darwinian evolutionary mechanisms. In nature, many species' have natural predators to weed out the weak or defective members. Since humans have no natural predators, nature had to adapt in order to continue the filtering process. Nature responded by making some members of the human species too unattractive to mate (the majority in the lower group are childless). Oddly, the leftists who consider themselves enlightened for believing in evolution entirely fail to see this glaring irony.



2006 Technology Breakthrough Roundup

The Futurist · 30 December 2006 · Archived copy · Original

The MIT Technology Review has compiled a convenient list of the most significant technological advances of 2006.

The Year in Information Technology

The Year in Energy : Plug-in cars, batteries, solar energy.

The Year in Biotechnology : A cure for blindness, and more.

The Year in Nanotechnology : Displays, sensors, and nanotube computers.

Most of the innovations in the articles above are in the laboratory phase, which means that about half will never progress enough to make it to market, and those that do will take 5 to 15 years to directly affect the lives of average people (remember that the laboratory-to-market transition period itself continues to shorten in most fields). But each one of these breakthroughs has world-changing potential, and that there are so many fields advancing simultaneously guarantees a massive new wave of improvement to human lives.

This scorching *pace* of innovation is entirely predictable, however. To internalize the true rate of technological progress, one merely needs to appreciate :

The Milli, Micro, Nano, Pico curves

The Impact of Computing

The Accelerating Rate of Change

We are fortunate to live in an age when a single calendar year will invariably yield multiple technological breakthroughs, the details of which are easily accessible to laypeople. In the 18th century, entire decades would pass without any observable technological improvements, and people knew that their children would experience a lifestyle identical to their own. Today, we know with certainty that our lives in 2007 will have slight but distinct and numerous improvements in technological usage over 2006.

Into the Future we continue, where 2007 awaits..

New Astronomy Images, and Evidence of Telescopic Advances

The Futurist · 7 January 2007 · Archived copy · Original

I happened to come across [this post](#), which displays the author's selections of the top astronomical photographs of 2006. The one I am particularly stunned by is #5, the transit of the Space Shuttle and International Space Station in front of the Sun. The precise timing needed to execute this image mind boggling, and probably less than one in a million. The photographer, [Thierry Legault](#), had to 1) know when the shuttle was approaching the ISS, 2) know when both of them would be in front of the sun relative to his location in France, which was a zone of observation only 7.4km wide, and 3) get this image in the 0.6 seconds of the transit duration.

Not all of these ten photographs are exclusively the result of instruments and technologies that did not exist a few years ago, but 3 to 4 of them are. As we have discussed before, [telescopic power is also an accelerating technology](#), and increasingly impressive images will continue to emerge as new telescopes and supporting resources become operational.

Little can match an astronomical discovery's ability to generate wonder, optimism, and just a general good mood. We shall see, within just the next couple decades, images that even the late Carl Sagan would have been in awe of.

Ethanol Prices May Tumble Through Termite Digestion Discovery

The Futurist · 18 January 2007 · Archived copy · Original

When most people think of termites, the reaction is predictably negative. After all, not only do they damage homes and bore holes through books, but they have a certain ugliness that even ants do not possess. However, this is another one of those times where a particularly formidable and vexing problem of civilizational significance meets a countering force from just about the last source anyone would expect. The loathed termite might actually atone for all the cumulative economic damage it has caused to human society over the centuries.

Both [MIT Technology Review](#) and [BusinessWeek](#) have, in the last 30 days, featured articles detailing how a termite's ability to digest wood is due to certain microbes in the digestive tract, which contain a gene that can be extracted and harnessed into processes to create cellulosic ethanol out of agricultural waste for a fraction of the current cost.

America's forests, agricultural waste, and 40 to 60 million acres of prairie grass could supply 100 billion gallons or more of fuel per year—while slashing greenhouse gas emissions. That would replace more than half the 150 billion gallons of gasoline now used annually, greatly reducing oil imports. It "will happen much faster than most people think," predicts Michigan State biochemical engineer Bruce E. Dale. "And it will be enormous, remaking our national energy policy and transforming agriculture."

Recent work has lowered the cost of this step thirtyfold, to about 50 cents per gallon of ethanol produced. "We now are not far away from the goal of 10 cents per gallon," says Glenn E. Nedwin, chief scientific officer at Dyadic.

Always remember that 1.5 units of ethanol are required to produce the same energy as 1 unit of gasoline. So far, US ethanol production has amounted to merely 7 billion gallons (enough to replace just 3% of gasoline consumption) in 2006, is barely cost-competitive with gasoline even with the agricultural subsidies the federal government has provided, and is heavily dependent on using corn which is also needed in the food industry. But if the termite enzyme can create a process that scales up to the extent of producing 100 billion gallons a year for under \$1 per gallon (already a more modest goal than what the scientists in the article are striving for) out of otherwise unused biomass, we just might tackle oil dependence, greenhouse gas emissions, and the trade deficit simultaneously.

The progress they make between now and 2010 will enable us to determine if this is on track to becoming a technological reality by 2015.

Update : There may also be a way to [create Ethanol from trash](#).

Update : [Algae may also be a large source of liquid biofuels that can compete with Ethanol](#).

Related :

[Why \\$70/barrel Oil is Good for America](#)

[\\$70+/barrel Oil, the Non-Crisis](#)

The Futurist's Stock Portfolio for 2007

The Futurist · 23 January 2007 · Archived copy · Original

I am going to present an investment portfolio to be tracked over the remaining 11 months and 7 days of 2007 (I should have done this on Jan 1, but the idea of doing a post didn't arrive at a convenient time). The hypothetical portfolio of \$100,000 will be invested in exchange-traded securities and mutual funds that reflect what I believe to be an optimal portfolio construction for 2007. We will, at the end of the period, see how the portfolio tracks the broader market. Dividends will be re-invested.

So the portfolio is :

Security	Symbol	Percentage
iShares Russell 2000 Value	IWN	30%
iShares Cohen and Steers Realty	ICF	20%
Morgan Stanley India Investment Fund	IIF	20%
Fidelity New Markets Income Fund	FNMI	10%
Electronic Arts	ERTS	5%
Activision	ATVI	5%
THQ Inc	THQI	5%
GameStop	GME	5%
		100%

Near misses (securities I did not add, but strongly considered) : FXI, GGP, PXN

The selections represent general principles and specific predictions outlined in the previously written articles :

[The Next Big Thing in Entertainment, Part I](#), [Part 2](#), and especially [Part 3](#)

[The Culture of Success and Stock Market Capitalization in Developing Countries](#)

[The Stock Market is Exponentially Accelerating too](#)

[The World Wealth Report 2005](#)

I hereby sign and seal this portfolio on January 23, 2007, bought at the prices today, to be examined on December 31, 2007, in relation to broader market indices.

Let's see how it turns out.

India-China Growth Rate Comparison

The Futurist · 7 February 2007 · Archived copy · Original

The [Economist](#) has a cover story on India's recent acceleration in economic growth, and how irrational exuberance among excitable Indians has led to an unsustainable overheating and the risk of a correction.



One chart that I have sought for years is a comparison of the historical growth rates between India and China. This article had that chart, going back to 1974. Both nations had pathetic growth between 1950 and 1970 (and were indeed even poorer than most African nations at the time). Since 1980, however, China's lead over India has ranged from large to enormous, with India only (maybe) breaking away from the the 6% trendline now. As a result, China has gone from being poorer than India in the 1970s to having over twice the per capita income today. Even now, the narrowing of the gap is questionable at best, as India is amazingly unable to fully cash in on the democratic system that China lacks.

What prevents India from making common-sense reforms and infrastructure upgrades that the rest of the world has been telling them about for decades? [India's cultural limitations](#) are the primary reason - most of India's key politicians are over the age of 70 and hail from an era and ideology that produced little other than poverty, embarrassment, and misery. Their passing will remove the ideological glass ceiling that prevents further reforms in India. When any country achieves faster economic growth, it is not just wealth that rises, but intellectual maturity, the quality and diversity of entertainment options, and safety rise as well. People even become taller and better looking after a generation of economic growth. I will write a much more colorful article on this subject in the future.

Update : [CNNMoney has an article that is somewhat harsher](#), but some of the author's statements are poorly reasoned. Statements 'India has more HIV infected people than any other country' are meaningless unless taken as a percentage of the total population, in which India does not appear anywhere near the top of the list.

Update 2 : [BusinessWeek](#) also has an article.

Related :

[World GDP Grew 4.3% in 2005](#)

[The Biggest Event of the Last 15 Years : The Stunning Defeat of Socialism](#)

[New UN Human Development Data Released](#)

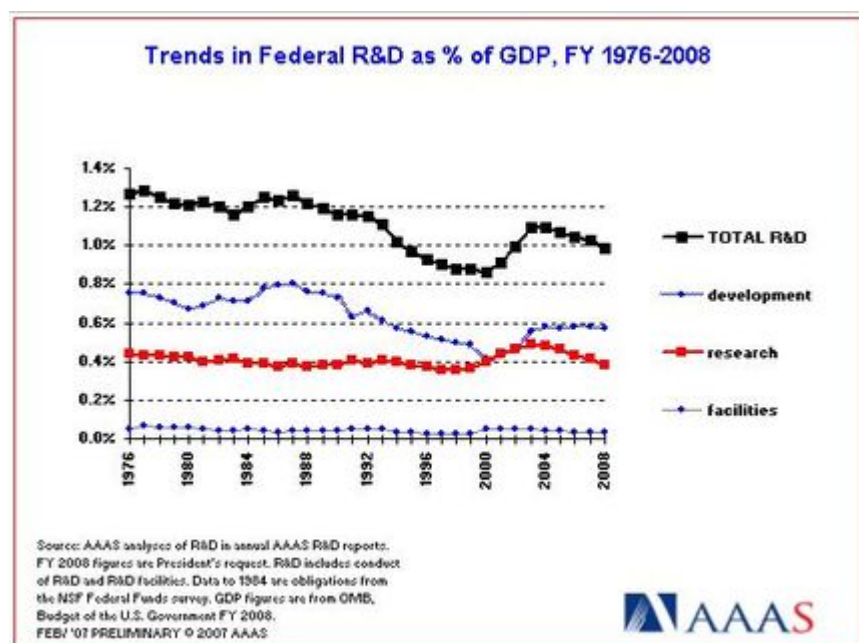
The Seeds of Technology

The Futurist · 18 February 2007 · Archived copy · Original

As we have seen before, **technological change follows a smooth, exponential curve**, with a relatively predictable rate of progress. However, the fruits of this change accrue to those individuals, corporations, and most importantly, those nations which position themselves to benefit from it. This requires funding for even the earliest stages of the process, where the return is going to be highly uncertain.

The US remains the foremost source of scientific breakthroughs and technological innovations, partly due to our willingness to fund federal basic research and sustain institutions that can productively utilize these funds. The \$140 Billion that the US spends on federal R&D is greater than the nominal total GDP of **all but 35 countries**. But are we funding research enough, and in the correct way?

First, let us take note of federal R&D expenditures as a percentage of GDP (which is the only way to accurately measure it).

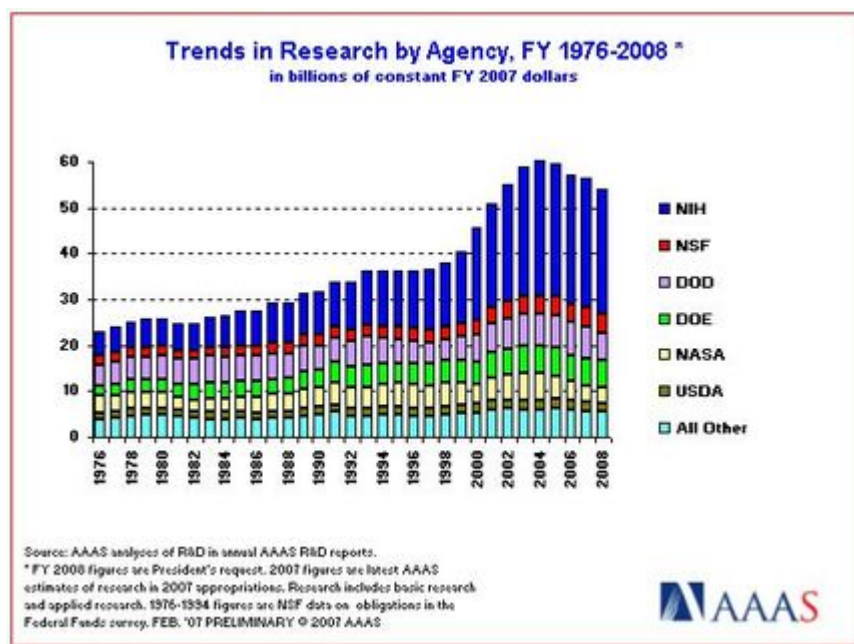


First, it appears that President Clinton trimmed R&D each year he was in office, until R&D fell from 1.2% to just 0.8% of GDP. The brief budget surplus he took credit for near the end of his term was largely at the expense of R&D expenditures. Had he maintained R&D expenditures at the same percentage of GDP throughout his Presidency, he would not have achieved a budget surplus. Now tell me, which outcome would you have rather had?

President Bush increased R&D funding and got it back to historical levels in his first term. However, his second term has brought another slight downward trend, which I hope is reversed in the next few years. He is still keeping it higher than it was for most of the Clinton years, however.

Some have argued that funding should gradually become an increasingly larger percentage of GDP, as technological changes continue to affect a greater share of the US economy. I might agree, but I also feel that since US scientific innovations lead to products and services that benefit every nation in the world, other prosperous nations should also be obligated to fund basic research in their own countries. Europe and China spend much less than the US, as a percentage of GDP, and it is time they contributed more to the advancement of human knowledge, rather than simply benefit from US resources.

As far as which fields of science are being funded and which are not, the next chart provides the answer. Basic research (the red line in the first chart) is broken out by agency.



It does appear that President Bush has reduced the funding of NASA, but he has increased NIH funding tremendously. Even defense has not risen over the past several years, contrary to popular belief. Energy research has risen slowly over the past 30 years, but there has been no major boost to the DoE at any point.

There you have it - the state of the seeds that lead to fruits we reap years and even decades hence. Is it enough? How do we measure which agency uses a dollar better relative to others? Should we be spending this much when other countries spend much less, and simply wait for our breakthroughs? Can more be done with the same amount of funding dollars?

BusinessWeek : The Greatest Innovations of All Time

The Futurist · 21 February 2007 · Archived copy · Original

BusinessWeek has an [article](#) and [slideshow](#) featuring a list of what the author estimates to be the 15 historical innovations that have created the greatest improvements to human life. Not all the innovations are technological or scientific - some are financial, political, and legal.

Rather than debate the candidates or the ranking, what leapt out at me is something that most people overlook, but something I have nearly made the primary theme of this blog :

Notice that of the 15 innovations, 11-12 emerged in the last 200 years, and only achieved wide participation/ownership in the last 60-80 years. The 5000 years preceding the 19th century had only 3-4 of these 15 innovations reach maturity. Even a major dispute with the list will inevitably lead to a different list that is similarly weighted very heavily to the recent past.

[Accelerating change](#) is visible in this list, even if the concept is not mentioned (if noticed at all) by the author. This also tells us that the next 30 years will have several new innovations disruptive enough to earn a place on such a list.

What will the next great innovations be, under this methodology? I think [nanotechnology](#) is one, and [virtual reality](#) is another that could make this list by 2020. Time will tell, but the most important thing to internalize is that the interval between each major transformative leap continues to shorten.

A Future Timeline for Energy

The Futurist · 25 February 2007 · Archived copy · Original

There are many independent streams of technological progress currently underway in the field of energy. I have written several individual articles on various breakthroughs in lighting, electric cars, ethanol, etc. But the time has come for a 'grand unifying' article that combines these seemingly unrelated innovations into a timeline for when we can expect which advances to have a measurable impact.

I hereby present a possible future timeline for disruptive improvements in energy technology, economics, and mass market adoption.

2007 : China's greenhouse gas emissions surpass that of the US. China requires 4.3 times as much energy as the US to produce each dollar of GDP.



2007-09 : Compact Fluorescent Lightbulbs and Light Emitting Diodes begin to replace incandescent bulbs across the US. By 2010, the typical US household is saving over \$100 per year in electricity costs.

2007-10 : Corn-based ethanol continues to generate only a small percentage of vehicle fuel in the US, despite the governmental support behind it.

2009 : The Automotive X-Prize of \$25 Million (or more) is successfully claimed by a car designed to meet the 100 mpg/mass-producible goal set by the X Prize Foundation.

2010 : Hybrid, plug-in hybrid, and fully electrical cars represent 5% of total new automobiles sold in the US, even if tax incentives have been a large stimulus. There are concerns about the load on the electrical grid from all of these new cars drawing power from ordinary home outlets, but given the massive reduction in household electricity consumed by lighting, this surplus nicely offsets the electrical demands of plug-in cars.

2011 : Thousands of wind turbines have been erected across Alaska, Canada, Russia, and the northern waters of Europe by now. Some European countries now derive over 25% of their electricity from wind.

2012 : Cellulosic ethanol technology becomes cost-effective and scalable. Biomass-derived fueling stations finally begin to find their way into most US population centers, but still displace only 15-20% of US gasoline consumption. New oil extraction technologies continue to exert downward pressure on oil prices, resulting in a continual tussle between biomass fuel and oil-derived fuel for cost competitiveness. All of this is bad news for oil-producing dictatorships.

2013 : Tesla Motors releases a fully electric 4-door sedan that is available for just \$40,000, which is only 33% more than the \$30,000 that the typical fully-loaded gasoline-only V6 Accord or Camry sells for in 2013.

2014 : Solar panels have become inexpensive enough for a typical house in California or Arizona to financially break even in under 5 years after installation, even after accounting for the cost of capital. Over 3 million US single-family homes have solar panels on their rooftops by now, and many of these homes are able to charge up their plug-in hybrids or fully electric vehicles entirely free of cost.

2015 : As predicted in early 2006 on *The Futurist*, a 4-door sedan with a 240 hp engine, yet costing only 5 cents/mile to operate (the equivalent of 60 mpg of gasoline), is widely available for \$35,000 (which is within the middle-class price band by 2015 under **moderate assumptions for economic growth**). This is the result of not only energy innovation, but also lighter, stronger nanomaterials being used in some body components, as well as computerized systems that make energy usage more efficient within the car.



2016 : Large industrial-grade solar panels, **enhanced with nanotechnology**, achieve unprecedented conversion rates of solar energy to electricity. The US has completed the construction of major solar farms in California, Nevada, and Arizona, collectively covering hundreds of square miles of desert land. **Similar farms are under construction in Australia, India, Saudi Arabia, Iraq, and Sahara Desert countries.** 10% of world electricity demand is now met through photovoltaics.

2018 : Among new cars sold, gasoline-only vehicles are now a minority. Millions of electricity-only vehicles are charged through solar panels on a daily basis, relieving those consumers of a fuel expenditure that was as high as \$2000/year in 2007. Even when sunlight is obscured and the grid is used, some electrical vehicles cost as little as 1 cent/mile to operate.

2020 : Gasoline fuels under one third of the passenger car miles driven in the US. Electricity and biomass fuels account for the remaining two-thirds, with electricity being the one crowding the other two out (electricity itself is primarily derived through solar, wind, and nuclear sources by now). US total oil consumption, in barrels, has decreased only somewhat, however, due to commercial airline flights (which still use petroleum-derived fuels). At the same time, oil consumption in relation to total US GDP is actually under half of what it was in 2007.

2025-30 : Electricity (indeed, *clean* electricity) now fuels nearly all passenger car miles driven in the US. There is no longer any significant fuel consumption cost associated with driving a car, although battery maintenance is a new aspect of car ownership. The average car weighs only 60% as much as the 2007 counterpart, but yet is over twice as resistant to dents. Most cars are self-driven by on-board intelligence, so human drivers can literally sleep in the car while being delivered to their destination.

Wind, solar, and nuclear technologies collectively generate 75% of the world's electricity needs.

Crude oil is, however, still used to create jet fuel. Since some passenger jets are capable of hypersonic speeds, oil consumption remains significant in this area.

Worldwide energy consumption is now 75% higher than what it was in 2007, moving us from 0.71 to 0.74 on **the Kardashev scale**.

Is this timeline too optimistic? **I found this research report from Clean Edge that goes out to 2016**, and they project that renewable energy industry revenue will grow by 15% a year from 2006 to 2016.

Let's see how closely reality matches this timeline.

Update (9/15/07) : Seven months after I created this timeline, **BusinessWeek has a slideshow that predicts the**

impact of many of the same technologies. In fact, CFLs, LEDs, the Tesla Roadster, Plug-in Hybrids, etc. are all items I wrote about even earlier.

America, in Relation to Peers

The Futurist · 9 March 2007 · Archived copy · Original

Do you feel that America is having a bad time? That economically, politically, and culturally, we are in a rut? Do you even wish that America had something that some other nation or region currently has?

Be careful what you wish for.

A European study has estimated that the EU economy is only as developed as the US was 22 years ago. This does not even include the newest, poorer members of the EU like Romania and Bulgaria, which would drag down the EU stats even further. Furthermore, the EU has a growth rate slower than that of the US, guaranteeing that the gap will continue to widen.

Related : [More on the Decline of Europe.](#)

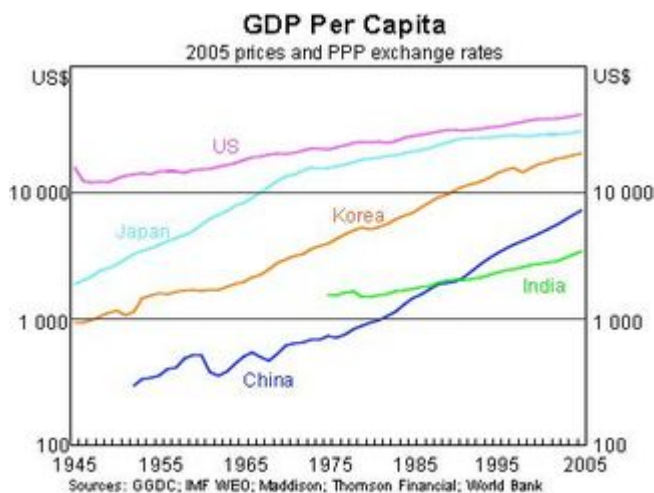
But China has a rapid economic growth rate, that enables it to catch up with the US, does it not? With China's huge population, it needs to merely achieve a per-capita GDP that is one fourth that of the US in order to surpass the total size of the US economy. That should be relatively easy, no?

China is not permitting new Internet cafes to open in 2007. So much for free-market supply/demand, or supercharging economic growth through participation in the information age. It appears that the question of how high prosperity can rise before the demand for personal freedoms directly forces the PRC to curb progress has been answered. The PRC will continue to face more direct tradeoffs between economic growth and the restriction of personal freedoms. It will be interesting to see which area they choose to make concessions in over the coming years.

How about India, then? India will never restrict Internet access for the public, and has a young, growing population that Europe lacks. GDP growth topping 8% certainly qualifies as enviable. Surely, India has potential.

And it will always have potential. If Europe is 22 years behind the US in economic growth, it would be impossible to calculate how far behind India is by that metric, as the US is only 231 years old (and has never been as poor as India is today). India's infrastructure is so shabby that highways have an average speed of 20 mph, and large cities have to resort to restricting electricity availability to six days a week in order to ease grid overloads. On the UN Human Development Index, India ranks a miserable 127th, even lower than many dictatorships and communist states. India's per capita GDP is just \$700 a year, a number which, by American standards, seems scarcely higher than zero. 8% annual GDP growth for the next 30 years will still only bring prosperity in India to where Mexico is today.

But, despite India being the poorest entity in this article, all Americans should note that India is the only entity here that is pro-US, and actually wants to emulate the US, rather than create an alternative model like the EU and China have attempted. India deserves pity, but also encouragement from America.



So there we have the state of three other regions that America is often compared to. I will also throw in this chart of per capita GDP on a PPP basis, over the last 60 years. The biggest takeaway from here is that basic growth appears easy, as a developing nation merely has to copy what was done by advanced nations before, but once a certain ceiling is reached, incremental growth becomes harder. No large country of over 50 Million people and a per capita GDP greater than \$20,000 a year has managed to sustain a growth rate higher than the **world average (currently 4.5%)** for an extended period. Thus, China's rapid growth will moderate long before high per-capita GDP is reached, just as Japan's and South Korea's has. Also note that India was richer than China all the way until 1991, and was probably at parity with South Korea and even near Japan in 1950, until India foolishly allowed itself to fall behind.

Remember, the true measure of a country is the net of how many people want to get in, and how many want to get out. This metric appears to rank America right on top.

Related : **Why the US Will Still be the Only Superpower in 2030.**

The Mainstreaming of Virtual Reality

The Futurist · 25 March 2007 · Archived copy · Original

BusinessWeek has [an article](#) and [slideshow](#) on the rapidly diversifying applications of advanced VR technology.

This is a subject that has been discussed heavily here on The Futurist, through articles like [The Next Big Thing in Entertainment, Parts I, II, and III](#), as well as [Virtual Touch Brings VR Closer](#). The coverage of this topic by BusinessWeek is a necessary and tantalizing step towards the creation of mass-market products and technologies that will enhance productivity, defense, healthcare, and entertainment.

Technologically, these applications and systems are heavily encapsulated within [The Impact of Computing](#) with very few components that are not exponentially improving. Thus, cost-performance improvements of 30-58% a year are guaranteed, and will result in stunningly compelling experiences as soon as 2012.

To the extent that many people who seek reading material about futurism are primarily driven by the eagerness to experience 'new types of fun', this area, more than any other discussed here, will deliver the majority of new fun that consumers can experience in coming years.

Update (4/7/07) : [HP unveils a variety of new technologies, from screens to sensors, designed to augment the realism of games.](#)

World and Asian Semiconductor Revenue Growth

The Futurist · 30 March 2007 · Archived copy · Original

I stumbled upon something while reading the [Asian Development Bank's](#) report on the world economy. No big surprises here, but one tiny chart stood out. The column chart of WW and Asian semiconductor sales from 2001 to 2006 indicates that while Asia accounted for just one third of semiconductor sales in 2001, they comprise half of it today.



This encompasses a number of the main topics I discuss on The Futurist. From [The Impact of Computing](#) (which is thus higher in Asia than in the rest of the world) to the [accelerating rate of GDP growth](#) (which necessitates [so many large Asian countries, totaling 3 billion people, to all grow at 6% or more per year](#), just to keep total world GDP at its trendline). From cellphone dispersion to PC adoption to enterprise server and router usage, semiconductor sales are just about the best indicator of economic and technological progress.

Let's see how big of a share of world semiconductor revenues Asia can ultimately consume before the relative maturity of the US market is emulated.

Related :

[Are You Acceleration Aware?](#)

[Economic Growth is Exponential and Accelerating](#)

Outsourced Education - the Latest Flattener

The Futurist · 19 April 2007 · Archived copy · Original

I have come across a modest yet revolutionary concept from an Indian startup by the name of **Tutorvista**. The concept is not a complex one, but if this company or others like it are even moderately successful with this business model, we stand to chip away at one of society's most stubborn obstacles to economic upliftment.

Tutorvista offers unlimited online tutoring in English and Mathematics for just \$100 a month, as well as preparatory coaching for standardized tests at fees under a tenth of those charged by traditional brand-name classes. All 500+ tutors are in India, have degrees in education and the subject taught, and work from home. I believe there are about 2500 students subscribing to the service to date. Tutorvista does, however, need to make substantial improvements to their website if they hope to acquire hundreds of thousands of new customers.

The tutoring sessions are interactive through the use of technologies that were not even available to consumers just 7 years ago. Real-time verbal dialogue is conducted via VoIP, while an onscreen electronic whiteboard enables written exchanges. Soon, **low-cost videoconferencing technologies** will combine with **high-bandwidth Internet connections** to expand interactivity into not just face-to-face lessons, but even multi-party discussions with each participant's face in one division of the screen.

Normally, such tutoring would cost \$30 to \$50 an hour or more. Yes, pessimists, racists, and socialists (sometimes the same people) **will whine about private tutors losing their wages to 'outsourcing'**. But this loss is dwarfed by gains derived from having access to competent individual tutoring now available to underprivileged or simply ambitious students in America. Is a 5th grader so keen on algebra that he wants to soak up 8th grade material? The risk to parents is just \$100 (and even that fee can probably be transferred to a lower grade if the material turns out to be too advanced). Does a student feel embarrassed about persistent difficulties with a particular subject? This model offers privacy that did not exist before.

Of course, to benefit from Tutorvista, an American student needs both a broadband connection and the self-discipline to study hard. It is arguable that students for which these two conditions are true do not correlate very closely with those who need the most help. Yet, I could predict the formation of innovative scholarships devised to grant high-school students some form of 'unlimited Tutorvista access until high-school graduation'. It may even become a popular perk offered by the parent's employer.

This, like Skype, Wikipedia, Zillow, and MapQuest, is yet another dramatic deflation in the costs (whether monetary or time/hassle-oriented) **of accessing a key human need**, and is a necessary step in **the acceleration of economic growth**. If Tutorvista or a similar company can succeed, the benefits to the US, Indian, and global economies will colossally dwarf the losses of in-person tutor wages and private school fees. Step back and take a moment to ponder what you have just read - the paradigm for the delivery of education has just changed.

The Politics and Economics of American Taxation

The Futurist · 22 April 2007 · Archived copy · Original

The US tax code, at 67,000 pages, is an embarrassing swamp of esoteric gobbledygook, unworthy of a nation which is supposed to be the shining light of capitalism, entrepreneurship, and productivity.

[Deroy Murdock](#) has a [detailed article](#) on how inefficient the mere *transaction* of collecting tax monies from individuals is :

“The IRS estimates they (small business owners) have to spend over 80 hours slaving at their computers to do their taxes, enough to rob them of the equivalent of a two-week paid vacation.”

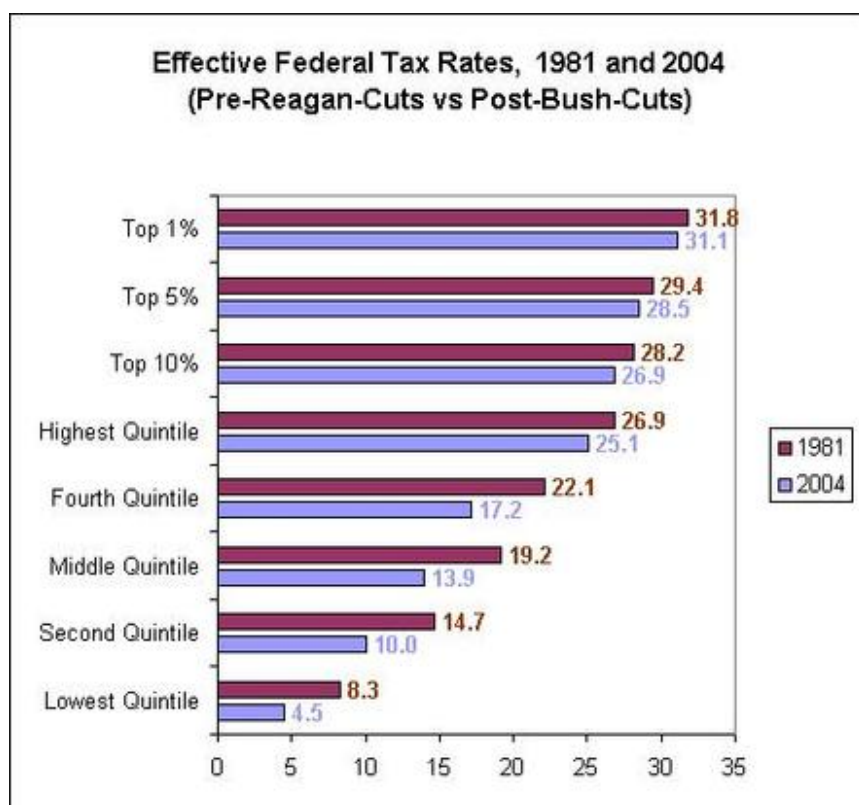
I don't need to remind any US residents on how time-consuming and/or costly their own tax preparation has been, but suffice it to say that if fees, time, processing resources at the IRS, and postal services are added up, the total burden adds up to \$400 to \$600 billion a year in transactional wastage for the US economy. [This is as large as the total economy of a country like Switzerland or Belgium.](#)

Just about the best thing that Washington could do to further stimulate the already robust US economy is simplify the process through which taxes are collected. Again, this is not a tax cut, but merely a reduction in the transaction costs of extracting the same amount of revenue from taxpayers. Yet, the resultant productivity gain would increase GDP by 2-3% almost immediately.

I am baffled why not just the Federal Government, but even many State Governments are unwilling to collect the same revenue through a simpler process. I hear rationalizations about how "tax accountants don't want to go out of business", but that excuse makes about as much sense as tearing up roads and relaying them repeatedly in order to employ workers. And since when has there been a 'tax accountants lobby' powerful enough to obstruct the wishes of just about every other taxpaying citizen and business in America?

The even bigger irony is that simple tax codes have been adopted in former *communist* regimes like Russia and Ukraine. Tax evasion has predictably plummeted, even as revenues have surged. Why is America unable to enact a capitalist principle that former Soviet states have implemented?

On the political side, while neither party has indicated any intention of simplifying the tax code, [Michael Mandel at BusinessWeek](#) has [created some revealing charts](#) on tax rates by income bracket, both before and after various tax cuts. Between 1981 and 2004, the lower the income quintile, the greater the magnitude of tax rate reduction has been due to tax cuts by Presidents Ronald Reagan and George W. Bush. If anything, the highest quintile is the only tier that has seen virtually no tax rate relief.



Also note the line chart showing the tax rate drop for the middle quintile after 2001. This utterly destroys the fashionable socialist statement that Bush's tax cuts were "for the rich" - a line often spewed by someone who is incapable of detailing precisely which tax bracket was lowered by how much. Of course, you may not have this chart handy the next time you encounter someone who opposes tax cuts for reasons they can scarcely explain. Thus, as usual, such a debate is won by forcing them to demonstrate knowledge of the subject behind their own question, through a question of your own.

If they say :

"....tax cut for the rich"

you can reply with :

"Please explain which tax bracket dropped by how much through Bush's tax cut. I need to see that you know how much the lower brackets dropped by."

or

"Why do you oppose Bush's tax cuts, but not Clinton's 1997 tax cuts? Clinton cut taxes on capital gains, which certainly is good for the economy, but is far more skewed towards the rich than income is. Why don't you describe Clinton's tax cuts in more detail for me?"

At any rate, these debates are easy to win. But I will not excuse President Bush or Congress from refusing to address tax simplification, and letting the horrendous statistic of 19 to 23 cents being wasted in the process of collecting each revenue dollar continue.

Hope is on the horizon, however. Globalization is introducing market forces that are putting downward pressure on tax rates and tax complexity worldwide. Ireland has outperformed the rest of Western Europe by a wide margin in the last 12 years due to vastly lower taxes, which in turn attracts workers and businesses away from higher-tax welfare states. If the US sees an exodus of business incorporations that are instead flocking to Ireland or Bermuda, perhaps Washington will finally act.

A Future Timeline for Automobiles

The Futurist · 5 May 2007 · Archived copy · Original

Many streams of **accelerating technological change**, from **energy** to **The Impact of Computing**, will find themselves intersecting in one of the largest consumer product industries of all. Over 70 million automobiles were produced worldwide in 2006, with rapid market penetration underway in **India and China**. Indisputably, cars greatly affect the lives of consumers, the economies of nations, and the market forces of technological change.

I thus present a speculative timeline of technological and economic events that will happen for automobiles. This has numerous points of intersection with the **Future Timeline for Energy**.



2007 : The **Tesla Roadster** emerges to not only bring Silicon Valley change agents together to sow the seeds of disruption in the automotive industry, but also to immediately transform the image of electrical vehicles from 'punishment cars' to status symbols of dramatic sex appeal. Even at the price of \$92,000, demand outstrips supply by an impressive margin.

2009 : The **Automotive X-Prize** of \$25 Million (or more) is successfully claimed by a car designed to meet the 100 mpg/mass-producible goal set by the **X Prize Foundation**. Numerous companies spring forth out of prototypes tested in the contest.

2010 : With gasoline at \$4/gallon, established automobile companies simultaneously release **plug-in hybrid vehicles**. **Hybrid, plug-in hybrid, and fully electrical cars represent 5% of total new automobiles sold in the US**, even if tax incentives have been a large stimulus. The habit of plugging in a car overnight to charge it starts to become routine for homeowners with such cars, but apartment dwellers are at a disadvantage in this regard, not having an outlet near their parking spot.

2011 : Two or more iPod ports, 10-inch flat-screen displays for back seat passengers, parking space detection technology, and embedded Wi-Fi adapters that wirelessly can transfer files into the vehicle's hard drive from up to 500 feet away are standard features for many new cars in the \$40,000+ price tier.

2012 : Over 100 million new automobiles are produced in 2012, up from 70 million in 2006. All major auto manufacturers are racing to incorporate new nanomaterials that are lighter than aluminium yet stronger and more malleable than steel. The average weight of cars has dropped by about 5% from what it was for the equivalent style in 2007.

2013 : **Tesla Motors** releases a **fully electric** 4-door sedan that is available for under \$40,000, which is only 33% more than the \$30,000 that the typical fully-loaded gasoline-only V6 Accord or Camry sells for in 2013.

2014 : Self-driving cars are now available in the luxury tier (priced \$100,000 or higher). A user simply enters in the destination, and the car charts out a path (similar to Google Maps) and proceeds on it, in compliance with traffic laws. However, a software malfunction results in a major traffic pile-up that garners national media attention for a week. Subsequently, self-driving technologies are shunned despite their superior statistical performance relative to human drivers.

2015 : *As predicted in early 2006 on The Futurist*, a 4-door sedan with a 240 hp engine, yet costing only 5 cents/mile to operate (the equivalent of 60 mpg of gasoline), is widely available for \$35,000 (which is within the middle-class price band by 2015 *under moderate assumptions for economic growth*). This is the result of combined advances in energy, lighter nanomaterials, and computerized systems.

2016 : An odd change has occurred in the economics of car depreciation. Between 1980 and 2007, annual car depreciation rates decreased due to higher quality materials and better engine design, reaching as little as 12-16% a year for the first 5 years of ownership. Technology pushed back the forces of depreciation.

However, by 2016, 40% of a car's initial purchase price is comprised of electronics (up from under 20% in 2007 and just 5% in 1985), which depreciate at a rate of 25-40% a year. The entire value of the car is pulled along by the 40% of it that undergoes rapid price declines, and thus total car depreciation is now occurring at a faster rate of up to 20% a year for the first 5 years. This is a natural progression of *The Impact of Computing*, and wealthier consumers are increasingly buying new cars as 'upgrades' to replace models with obsolete technologies after 5-7 years, much as they would upgrade a game console, rather than waiting until mechanical failure occurs in their current car. Consumers also conduct their own upgrades of certain easily-replaced components, much as they would upgrade the memory or hard drive of a PC. Technology has thus accelerated the forces of depreciation.

2018 : Among new cars sold, gasoline-only vehicles are now a minority. Millions of electricity-only vehicles are charged through solar panels on a daily basis, relieving those consumers of a fuel expenditure that was as high as \$2000/year in 2007. Even when sunlight is obscured and the grid is used, some electrical vehicles cost as little as 1 cent/mile to operate.

2020 : New safety technologies that began to appear in mainstream cars around 2012, *such as night vision, lane departure correction, and collision-avoiding cruise control*, have replaced the existing fleet of older cars over the decade, and now US annual traffic fatalities have dropped to 25,000 in 2020 from 43,000 in 2005. Given the larger US population in 2020 (about 350 Million), this is a reduction in traffic deaths by half on a per-capita basis.

2024 : Self-driving cars have overcome the stigma of a decade prior, and are now widely used. But they still have not fully displaced manual driving, due to user preferences in this regard. Certain highways permit only self-driven cars, with common speed limits of 100 mph or more.

2025-30 : Electricity (indeed, *clean* electricity) now fuels nearly all passenger car miles driven in the US. There is no longer any significant fuel consumption cost associated with driving a car, although battery maintenance is a new aspect of car ownership. Many car bodies now include solar energy absorbant materials that charge a parked car during periods of sunlight. Leaving such cars out in the sun has supplanted the practice of parking in the shade or in covered parking.

Pervasive use of advanced nanomaterials has ensured that the average car weighs only 60% as much as a 2007 counterpart, but yet is over twice as resistant to dents.

I believe that this timeline represents the the combination of median forecasts across all technological and economic trends that influence cars, and will be perceived as too optimistic or too pessimistic by an equal number of readers. Let's see how closely reality matches this timeline.

Further Thoughts on US Immigration Policy

The Futurist · 25 May 2007 · Archived copy · Original

I wrote an article on February 20, 2006 about the real reason the US government refuses to regulate illegal immigration, and why the simplistic rationales floating around are bogus. I believe the points provided in that article continue to be true.

My thoughts on general immigration to the US are free-market oriented, and thus in opposition to isolationist conservatives as well as big union leftists. I believe that, within reason, immigration to the US should accomodate market forces.

However, the immigration situation today is nearly the opposite of this. 11 million have entered the US illegally, and are mostly at the bottom of the skill ladder, thus consuming far more taxpayer resources than they contribute. They are actually a disproportionally high percentage of our prison population. At the same time, the pathway for highly skilled immigrants to smoothly and easily settle in the US is bureaucratic, painful, and often takes 7-12 years to complete. During this process, they are restricted from changing employers to seek better opportunities, are unable to secure permission for their spouses to work, and live with the psychological burden of being in limbo for an inhumane duration of time.

Making it easy for people at the bottom of the skill ladder to come here through *violation* of our laws, while making it extremely tortuous for people at the top of the skill ladder to come here *legally*, has got to be just about the biggest failure in US governmental policy today.

I am under no illusions that the mediocre intellects in the US government will be able to execute such a simple yet beneficial overhaul of our immigration paradigm, but I will propose a solution anyway.

The US should allow free, easy, unlimited immigration of any individuals who have completed a Bachelor's degree in any field, from any country, from a demonstrably legitimate institution. The US decides which institutions meet the criteria of accreditation/legitimacy, and maintains the list, by country, on an easily accessible website. I would not even restrict it to people with only engineering degrees, or people who have only been educated in English. I believe that just about anyone with this level of education can quickly get a decent job in America, particularly since only those who are confident in their abilities will make the move to begin with.

Currently, about 30% of US adults above the age of 25 possess a Bachelor's degree, and it makes sense to bring in people who increase this percentage, rather than decrease it (as current unskilled illegals do). The unemployment rate for people with a Bachelor's degree is just 1.2%. Even a policy this open will not result in more than 750,000 people immigrating to the US per year. At an average of \$60,000 a year, this adds an incremental \$45 Billion to US GDP every year, which is a 0.3% increment to GDP growth every year.

At the same time, immigration of people with less education should be restricted to minimal quantities. There is no reason to dilute the educational attainment of US society, and thus dilute per-capita GDP. The bogus claim that "they do critical jobs that Americans will not do" is easily disproven by the fact that in the 1980s and 1990s, states like Ohio, Pennsylvania, New Hampshire, North Carolina, etc. were fully functioning societies without the need for a vast underclass of unskilled illegals. US-born citizens did minimum wage jobs in those societies.

In short, we should bring in more above-average people and fewer below-average people. The simple policy outlined above will have vast and dramatic benefits to the US economy and American society. Economic growth and tax receipts will surge. Real estate prices will rise and construction will boom. MNC's will re-center more of their operations in the US. College-educated immigrants are the cause of almost no violent crime. Political and economic ties with India and China will strengthen, as most of the new immigrants will be from these two nations. There is virtually no downside amongst these multiple upsides, and I challenge anyone to come up with one (the

notion of wage depression through such immigration is already debunked).

Yes another benefit is the destruction of 'political correctness' that accompanies the present debate. An education-weighted immigration policy will favor Indian, Chinese, South Korean, and Russian immigration, while locking out many Mexican and Central American immigrants. **Different cultures attach differing importance to education**, and while this is readily visible in the free market that is the US workforce, multiculturalism has erected barriers to obstruct these market forces. It is time that the US became more pragmatic in this regard.

Australia, a very pragmatic and well-run nation, already has a policy that gives preference to highly skilled immigrants. Thus, **Australia's Human Development Index has surpassed that of the US**. Ireland, too, has executed a similar strategy with great success, and is now wealthier than Britain, France, and Germany.

Again, I have no hope that such a simple and constructive overhaul will occur. If only the US were shrewd **(again)**.....

Update (6/21/07) : **BusinessWeek has an article about exactly this**, one month later than I have written about it here.

New Gadgets for the Digital Home - A BusinessWeek Slideshow

The Futurist · 28 May 2007 · Archived copy · Original

BusinessWeek has a [slideshow](#) revealing new electronic devices that a consumer could use to enhance (or complicate) certain aspects of daily life. Among these is the very promising Sunlight Direct System, [which I discussed back on September 5, 2006](#). Others, such as the Lawnbott (\$2500), cost far more than the low-tech solution of hiring people to mow your lawn for the entire expected life of the device, ensuring that mass-market adoption is at least 4-5 years away.

All of this is a very strong and predictable manifestation of [The Impact of Computing](#), which mandates that entirely new *categories* of consumer electronics appear at regular intervals, and that they subsequently become cheaper yet more powerful at a consistent rate each year. Let us observe each of these functional categories, and the rate of price declines/feature enhancements that they experience.

The Semantic Web

The Futurist · 11 June 2007 · Archived copy · Original

The World Wide Web, after just 12 years in mainstream use, has become an infrastructure accessed by hundreds of millions of people every day, and the medium through which trillions of dollars a year are transacted. In this short period, the Web has already been through a boom, a crippling bust, and a renewal to full grandeur in the modern era of 'Web 2.0'.

But imagine, if you could, a Web in which web sites are not just readable in human languages, but in which information is understandable by software to the extent that computers themselves would be able to perform the task of sharing and combining information. In other words, a Web in which machines can interpret the Web more readily, in order to make it more useful for humans. This vision for a future Internet is known as the Semantic Web.

Why is this useful? Suppose that **scientific research** papers were published in a Semantic Web language that enabled their content to be integrated with other research publications across the world, making research collaboration vastly more efficient. For example, a scientist running an experiment can publish his data in Semantic format, and another scientist not acquainted with the first one could search for the data and build off of it in real time. Tim Berners-Lee, as far back as 2001, said that this "**will likely profoundly change the very nature of how scientific knowledge is produced and shared, in ways that we can now barely imagine.**"

Some are already referring to the Semantic Web as 'Web 3.0'. This type of labeling is a reliable litmus test of a technology falling into the clutches of emotional hype, and thus caution is warranted in assessing the true impact of it. I believe that the true impact of the Semantic Web will not manifest itself until 2012 or later. Nonetheless, the Semantic Web could do for scientific research what email did for postal correspondence and what MapQuest did for finding directions - eliminate almost all of the time wasted in the exchange of information.

"Mr. Gorbachev, Tear Down This Wall."

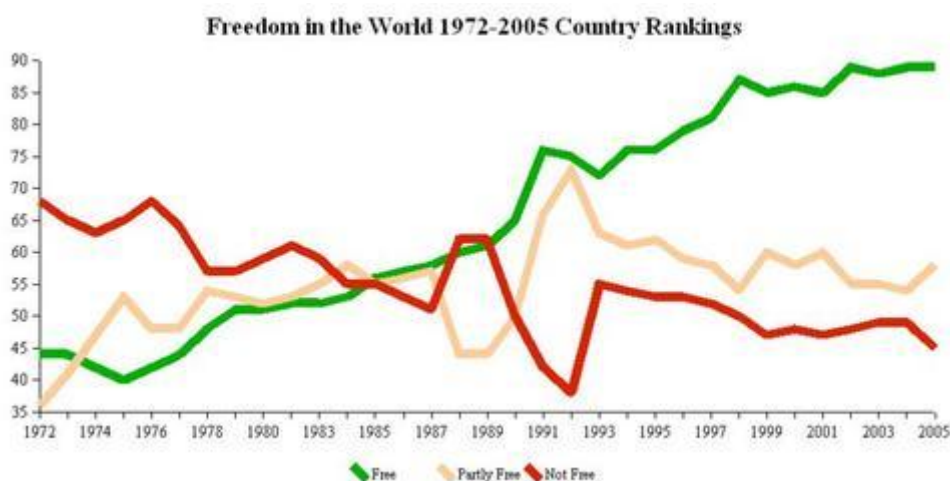
The Futurist · 12 June 2007 · Archived copy · Original



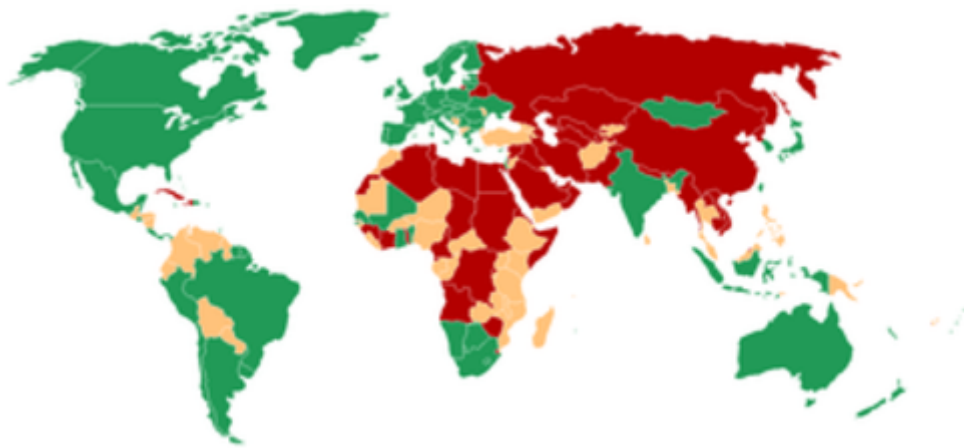
It was 20 years ago today, on June 12, 1987, that President Ronald Reagan delivered his famous speech at the Berlin Wall. Audio highlights are available on YouTube [over here](#).

In studying this speech, the timing and political tactics of it, particularly when viewed in historical context, are extraordinary. Reagan could have delivered this speech at any time, but chose to do it only after 6.5 years in office. Perhaps it is just a coincidence, but perhaps Reagan saw signs that by 1987 the USSR's economy was teetering on the precipice of a downfall. Perhaps Reagan saw in Mikhail Gorbachev the first Soviet leader who truly wanted the USSR to reform. It was thus the ideal time to remind the world, now in an era of cable television, that the USSR was not willing to let East Berliners interact with the Western world. It was the ideal time to demonstrate that communism could not attract people to it by their own free will. It was the ideal time to gain a psychological monopoly on the universal concepts of aspiration and hope, in a speech *audible* on the other side of the wall. If Gorbachev was truly a reformer, there was only one way to indisputably prove it.

But did a mere speech really have such an effect on a powerful empire? Just because the Berlin Wall fell just 2 years later, and the USSR itself peacefully dissolved just 4 years later, does not mean the speech was anything more than well-timed and inspiring. The trend of nations migrating towards democracy was evident long before Reagan became President. Yet consider that in just 20 years, the number of genuine democracies in the world has risen from under 60 in 1987 to 90 today. The number of unfree regimes has thus dropped correspondingly.



In particular, it is the nations of Eastern Europe that transformed the most in the years following Reagan's speech. Now, almost all the nations of Eastern Europe, including former Soviet states, are full democracies. This would have been unthinkable just 20 short years ago, ensuring that this speech become a symbol of the watershed moment when cracks in the Soviet Union became just too numerous to cover up.



Lastly, Reagan's speech contains lessons that modern leaders, particularly George W. Bush, would do well to learn. The public is fickle, and cannot be expected to put in the effort to become fully informed about the complex geopolitical issues that affect their societies. A leader's job is to package an ideology into simple, attractive terms that capture the public's basic aspirations. This use of soft power should never be underestimated. George W. Bush could do just as much to overcome rogue states than any military expenditure would achieve, by simply going to South Korea, getting as close to the DMZ as he can, and invoking Ronald Reagan :

General Secretary Kim Jong-Il, if you seek peace, if you seek prosperity for North Korea and Eastern Asia, if you seek assistance from America, come here to this border. General Secretary Kim Jong-Il, open this border. General Secretary Kim Jong-Il, tear down this demilitarized zone!

While Kim Jong-Il is an evil psychopath, and certainly should not be compared to Mikhail Gorbachev at any level, this would still bring the spotlight of the world on the oppression and suffering in North Korea, and force Kim Jong-Il to do something to try and save face, which means he either has to make a small concession to the winds of freedom, or react negatively and look even worse. Either way, the onus squarely is placed on him.

I believe this template has a role to play once again.

Liquid Mirrors May Boost Future Telescopes

The Futurist · 23 June 2007 · Archived copy · Original

On September 28, 2006, [I made the case that telescopic power is indeed an accelerating technology](#), set to improve at an estimated rate of 26% a year for the next 30 years. I believe that increasingly more powerful telescopes will ensure that we discover the first genuinely Earth-like planet in another star system by 2011, and that by 2025, we will have discovered thousands of such planets.

In support of this thesis of accelerating telescope improvement, I had to bring attention to one particular prospective technology that greatly increases the chances of this predicted rate of improvement holding true : [Liquid mirrors that could at some point replace glass in the largest telescopes](#) (from MIT Technology Review).

The mirror is a pool of salt-based liquids that only freeze at very lower temperatures, coated with a silver film. While practical usage is at least 20 years away, the details reveal a technology that is brilliantly simple, yet tantalizingly capable of addressing almost all of the problems facing the construction of giant telescopes. Glass mirrors are exceedingly difficult to scale to larger sizes, and even the most minor defect can render a mirror useless. Reflective liquid, by contrast, can be scaled up almost indefinitely, limited only by the perimeter of the enclosure it is placed in. External blows that would crack or scratch a glass mirror would have no effect on a liquid that could quickly return to the original shape.

I don't expect updates on this technology in the near future, but the next logical step would be for a smaller telescope to be demonstrated to use this technology. If that succeeds, the ultimate goal would be, by 2030, a massive telescope more than 200 meters in diameter placed on the Moon, where the sky is free of atmospheric distortions, and the ground is free of tiny seismic shaking. This would enable us to observe Earth-like planets at a distance of up to 100 light years, as well as observe individual stars near the center of the Milky Way galaxy (30,000 light years away).

Related :

[Are You Acceleration Aware?](#)

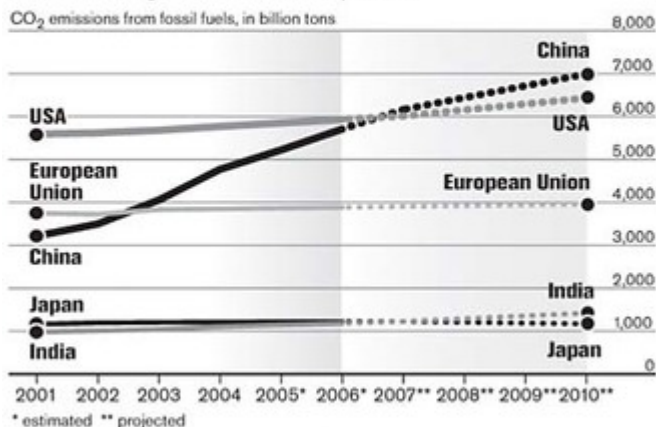
[Finding Earth-like Planets Will Soon be Possible](#)

An Inconvenient Truth

The Futurist · 24 June 2007 · Archived copy · Original

China surging to No. 1 position

Data about China's greenhouse gas emissions has long been controversial because of the Chinese government's faulty record keeping. But new data indicate that China's emissions began to surge in 2001 and have been rising much faster than expected.



Sources: Chronicle research; China National Bureau of Statistics; International Energy Agency; U.S. Energy Information Administration

The Chronicle

As you may have heard by now, in 2007, **China is set to surpass the US in the emission of greenhouse gases**. This has many implications for the concept of environmentalism, and for the geopolitical landscape.

China takes 4.3 times as much energy as the US to produce each dollar of GDP. Thus, China, with an economy less than a fourth the size of the US, already emits more. It is true that China's per capita emissions are much lower than the US due to China's much greater population. However, the US is not the highest in per capita emissions either. Small nations like Canada and Norway top that list.

Now consider the implications of this for the near future. By 2012, China's emissions will be a clear 20% higher than the US, which is a delta too large to ignore. The environmental movement has some people (like Thomas Friedman) who genuinely care about reducing pollution. However, a large subset are merely anti-US, anti-capitalism radicals who seek to mask their agenda within the altruism of environmental concerns. A beloved non-Western, undemocratic nation being a bigger polluter than the US is simply too inconvenient of a reality for their agenda. This will split the environmental group into two opposing factions - those who truly seek to curb emissions worldwide, and those who are merely driven by anti-Americanism and anti-capitalism. This civil war will be interesting, to say the least, and the purging of the phonies could just be the best thing to happen to the environmental movement, making it palatable enough for greater participation from mainstream people.

Furthermore, this is an example of point 10) in my essay on **Why the US Will Still be the Only Superpower in 2030**. China is not prepared for the burdens of being the primary recipient for blame on a major global issue. As the heat on the US reduces at China's expense, China will find that the upper rungs on the ladder to superpowerdom bring the attachment of heavy weights that make each subsequent rung increasingly difficult to scale. Getting to the top is just not as easy as it may seem, as China will continue to discover.

Economic Growth is Exponential and Accelerating, v2.0

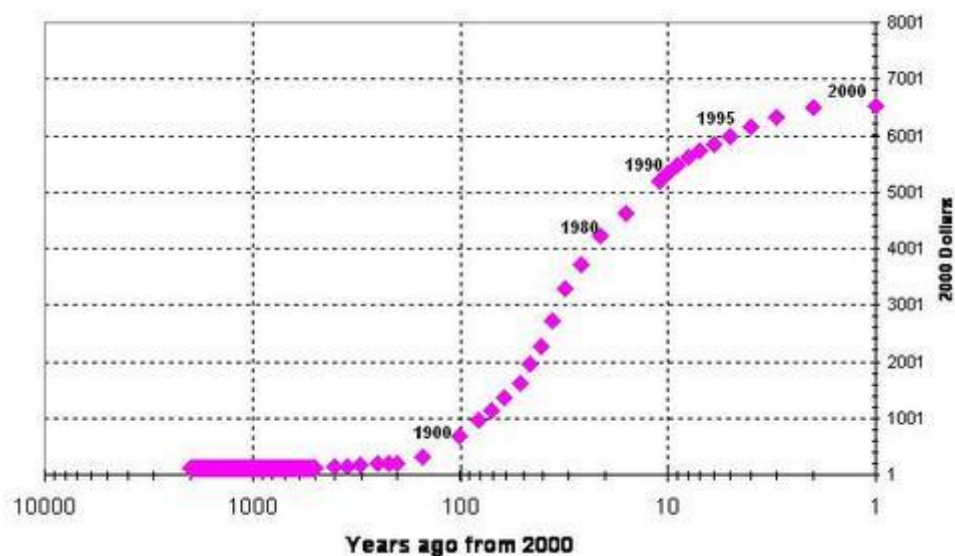
The Futurist · 12 July 2007 · Archived copy · Original

If we were to make a list of subjects ranked by the gap between the civilizational importance of the topic and the lack of serious literature devoted to it, historical acceleration of economic growth would be very near the top of the list. [I wrote an article on the subject way back on January 29, 2006](#) (version 1.0), but now it is time for a much more substantial treatise.

To whet your appetite, read the article "[Are You Acceleration Aware?](#)", which is the critical piece of any attempt at Futurism.

In the modern age, we take for granted that the US will grow at 3.5% a year, and that the world economy grows at 4% to 4.5% a year. However, these are numbers that were unheard of in the 19th century, during which World GDP grew under 2% a year. Prior to the 19th century, annual World GDP growth was so little that changes from one generation to the next were virtually zero. [Brad Delong has some data on World GDP from prehistoric times until 2000 AD](#).

If I put historical per-capita GDP through 2000 in a logarithmic timescale, we see the following :



The theme of acceleration readily presents itself here, and even disruptive events like the Great Depression still do not cause more than a temporary deviation from the long-term trendline. A different representation of the data would be to notice the shrinking intervals that it takes for per-capita World GDP to double.

10000 BC to 1500 : 11500 years without doubling

1500 to 1830 : 330 years

1830 to 1880 : 50 years

1880 to 1915 : 35 years

1915 to 1951 : 36 years (Great Depression and World Wars in this period)

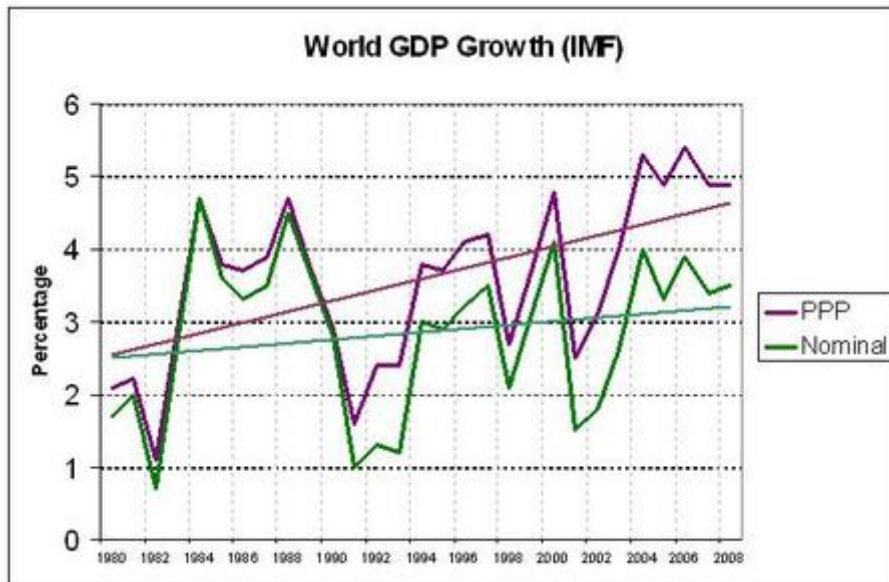
1951 to 1975 : 24 years (recovery to trendline)

1975 to 2003 : 28 years

2003 to 2024-2027? : 21-24 years (on current trends)

This not only further reveals acceleration, but also indicates that massively disruptive world events still result in merely temporary deviations from the long-term trendline.

Additionally, we can take the more granular IMF data of recent World GDP growth, and plot a trendline on it. Both nominal and PPP growth rates are available, and are diverging due to the increasing size and growth rates of India and China. Unfortunately, the IMF data only goes back to 1980, and 28 years are not enough to plot an ideal trendline, but nonetheless, the upward slope is distinct, and recessions (which still do not push World GDP growth into negative territory) are invariably followed by steep recoveries.

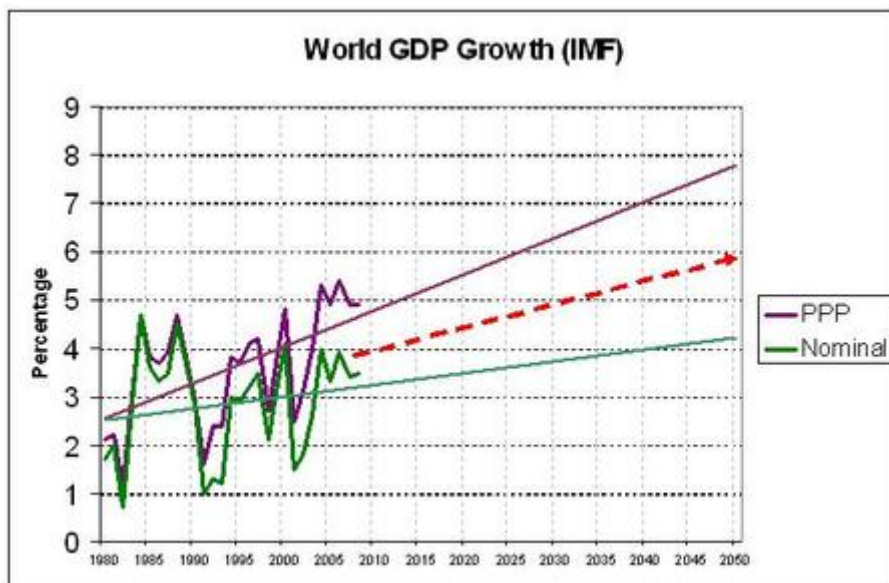


It is also important to note that the standard deviation of the IMF data for World GDP growth rates is about 1% a year, for both the nominal and PPP series (1.07% and 1.14% respectively, to be exact). The **rules of standard deviations** dictate that 68% of the time, a data point will be within one standard deviation of the mean, 95% will be between two standard deviations, and 99.7% will be within three.

Thus, in a simple example, if the World GDP growth trendline is currently at 4% a year, there is a 68% chance that the next year will be between 3% and 5%, and there is only a 0.3% chance that the next year will be below 1% or above 7% growth. This means that a worldwide recession with a year of negative growth is extremely improbable, just as improbable as a year with stupendous 8% growth. There is not a single year in the 1980-2007 IMF data with negative GDP growth, and virtually none under 1% growth.

Pessimists like to say that "the Great Depression will happen again", but not only was the Great Depression at a time when the trendline was at a lower annual growth rate than today, but the **Great Depression comprised of 6 years of GDP falling below the trendline, simply because it followed a period of many years where GDP was substantially above the trendline.** Furthermore, this was for US GDP. World GDP's deviations may have been even less severe, as some nations, such as France, Japan, and China, were left relatively unscathed by the Great Depression.

Now, what happens if we project these trendlines through the 21st century? The dotted red line represents the median trend assuming that nominal and PPP growth rates converge at some intermediate level.



I can apply this trendline for World GDP growth, make assumptions of total world population to arrive at per capita World GDP growth, and add it back to the first graph. The assumed growth rates, by decade, in per capita income are :

2007-2020 : 3.5%

2020-2030 : 3.5-4.0%

2030-2040 : 4.0-5.0%

2040-2050 : 5.0-6.0%

This leads to estimates for per-capita GDP at PPP, in 2007 dollars, to be :

2007 : \$10,000

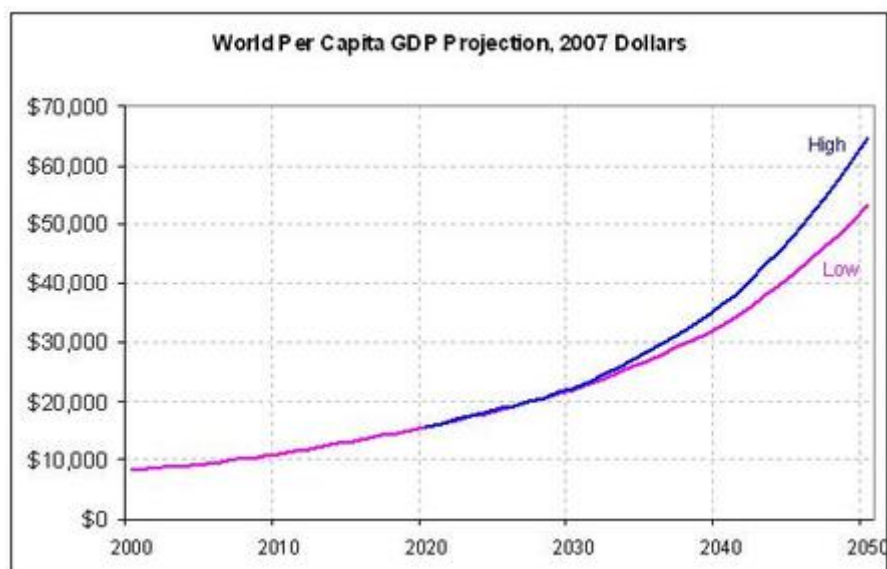
2020 : \$15,155

2030 : \$22,400

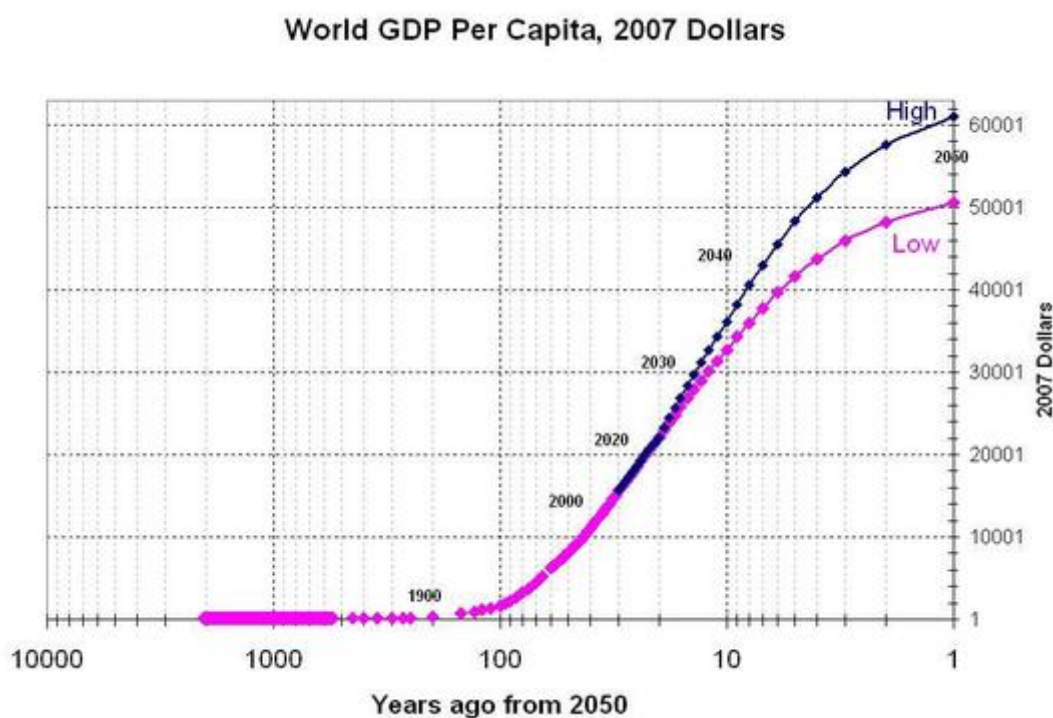
2040 : \$32,600 - \$36,000

2050 : \$53,200 - \$64,500

Which, when plotted, provides the following :



Or, when a longer view is taken, in terms of logarithmic periods going back from the year 2050, we see :



Needless to say, this degree of acceleration in economic growth affects nearly every possible facet of the world in the 21st century. From a **continually rising stock market** to the **proliferation of millionaires** to the rapid upliftment of all **metrics of human development**, massive abundance is a certainty. The inevitable derivatives of wealth, such as the **spread of democracy**, the **upliftment in the sophistication of human psychology**, and thus a **corresponding drop in warfare**, will soon follow. Resolving current problems, such as reducing poverty in developing regions, to funding sophisticated healthcare technologies, to increasing literacy, to funding ambitious space exploration, are merely just a matter of time.

Inevitably, even the **average citizen in the mid-21st century** will have access to many material and psychological opportunities that even the wealthiest of today do not have. Turn that frown upside down, for you are in for an exciting time as you ride the tsunami of prosperity that is about to immerse you.

This article is the inaugural entry into a new category here at The Futurist titled "Core Articles". These are the

articles which are designed to form the cornerstone of a comprehensive understanding of the future, and are suggested reading for anyone interested in the subject. Additional articles will be upgraded to "Core" status as augmentations to them accumulate.

Related :

[These Are the Best of Times](#)

[The Stock Market is Exponentially Accelerating](#)

[The Psychology of Economic Progress](#)

[The Age of Democracy](#)

[The Winds of War, the Sands of Time](#)

[Are You Acceleration Aware?](#)

A Hornet-sized Robotic Insect Can Now Fly

The Futurist · 22 July 2007 · Archived copy · Original

A robotic insect, similar in size and weight to a wasp or hornet, has successfully taken flight at Harvard University (article and photo at [MIT Technology Review](#)). This is an amazing breakthrough, because just a couple of years ago, such robots were pigeon-sized, and thus far less useful for detailed military and police surveillance.

At the moment, the flight path is still only vertical, and the power source is external. Further advances in the carbon polymer materials used in this robot will reduce weight further, enabling greater flight capabilities. Additional robotics advances will reduce size down to housefly or even mosquito dimensions. Technological improvements in batteries will provide on-board power with enough flight time to be useful. All of this will take 5-8 years to accomplish. After that, it may take another 3 years to achieve the capabilities for mass-production. Even then, the price may be greater than \$10,000 per units.

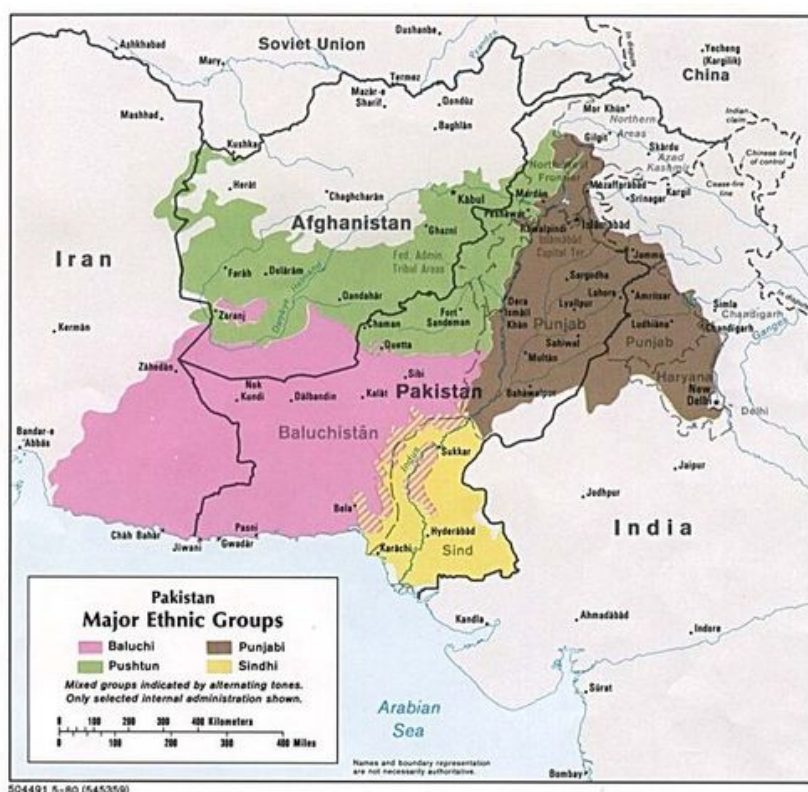
Needless to say, by 2017-2020, this may be a very important military technology, where thousands of such insects are released across a country or region known to contain terrorists. They could land on branches, light fixtures, and window panes, sending information to one another as well as to military intelligence. Further into the future, if these are ever available for private use, than that could become quite complicated.

Pakistan on the Precipice

The Futurist · 6 August 2007 · Archived copy · Original

As long-time readers know, this weblog has an optimistic outlook on most aspects of our future. However, there is one particular topic on which I have not yet written, even though I read every available article on the subject. It is a topic on which I can't assign a sizable probability to any positive outcome. It is the topic of Pakistan and its nuclear weapons.

Pakistan is a country that did not exist until 1947, when it was carved out of British India at the time of Indian Independence. There were two non-contiguous pieces of Pakistan on either side of India, and East Pakistan separated to become Bangladesh in 1971, **after a genocide in East Pakistan killed 1.5 million people** (from Wikipedia).



Today, the remaining nation of Pakistan still has 160 million people, the political boundaries of which still do not correlate to any particular ethnic homogeneity. In a nutshell, the massive Indus river flows through the middle of the country, to the east of which reside Punjabi and Sindhi groups, which are quite Indian-like in appearance, language, cuisine, and culture, and to the west of which are found Pashtuns and other groups with a distinctly Turkic and Persian culture and appearance. The Indus river has historically been the natural boundary between Indian and Turco-Persian civilizations for over 2000 years, and evidence of this is visible in Pakistan to this day (image from Wikipedia).

The 'Indian-like' part of Pakistan amounts to 75% of Pakistan's population, and is experiencing economic growth approaching that of India itself, at 6% to 7% a year. Globalization is rapidly lifting people out of poverty for the first time. Despite this, however, **Pakistan remains one of the poorest countries outside of Africa**, and also a country where **democracy is distant, unlike in neighboring India**.

But this 75% of Pakistan is secondary. The most crucial region is actually the most remote, most medieval, most undeveloped segment of Pakistan, where under 10% of the population resides. It is the Northwest Frontier Province and Waziristan, where Pakistan's government has never had total control, and where local tribal customs were the only recognized law. Until the Taliban and Al-Qaeda came to town.

Now, to grasp the magnitude of the potential horror, consider the following three facts :

- 1) Pakistan has 30-50 nuclear weapons. Whether this technology was delivered directly by China or through North Korea in the 1990s is moot at this point.
- 2) Al-Qaeda and the Taliban now control many districts of Northern Pakistan, with Ayman al-Zawahiri and Osama bin Laden (if still alive) also residing there. Pakistan's army and government have little power to expel Al-Qaeda and the Taliban, and they continually attempt to assassinate President Pervez Musharraf.
- 3) The founder of Pakistan's nuclear program, Abdul Qadeer Khan, was found to be selling nuclear secrets in the black market. His customer list is still unknown, and there may have been, or still be, others like him.

I can't see how the combination of these 3 facts can result in anything other than the detonation of a nuclear weapon in an act of terrorism against a major US or European city, between now and 2020. Can anyone say with confidence that the probability of this is low?

Pakistan has already had nuclear weapons for 9 or more years, so why is the risk greater now? This brings us back to point 2), and to understand the ominous trend of the Taliban gaining control over a greater and greater share of Pakistan, [read some of Bill Roggio's articles](#). In particular, [this map tracks the rate of advancement](#) of the Taliban's control, and distinctly shows them to be metastasizing deeply into Pakistan at an alarming rate.

President Musharraf is nominally an ally of the US in the War on Terror, to the extent that he cracks down on terrorists when US demands to do so reach a certain intensity. But this secular dictator is the thinnest of buffers between the current state and a nightmare scenario. If Musharraf is assassinated and theocratic rule prevails in Pakistan, it would be far worse than the 1979 events in Iran. Whatever remaining chance there is for terrorists being prevented from gaining access to nuclear weapons (if it is already not too late) resides with President Musharraf, or a similarly secular successor, remaining in power.

If the Taliban do come into power, the options are few. While a simple invasion by the US, India, and NATO would dispose of the Taliban quickly, it may not prevent them from retaining and smuggling out the nuclear weapon capabilities. While most Punjabi and Sindhi Pakistanis have no desire to be ruled by the Taliban, they may not be able to throw off the yoke of subjugation even through a massive civil war (again, with the nuclear technology easily walking off).

Be afraid. Be very afraid.

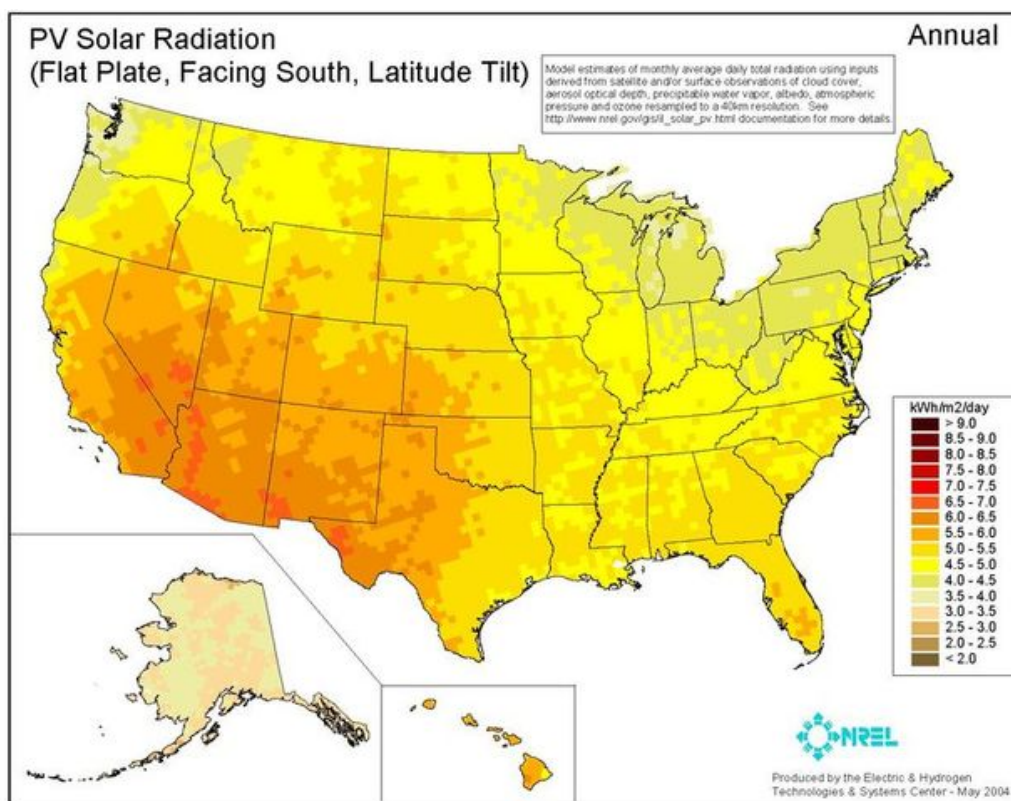
Solar Energy Cost Curve

The Futurist · 19 August 2007 · Archived copy · Original

Forbes has a whole [feature on Solar Energy](#) this week. Within, I found a chart that I have been seeking for a long time - a chart tracking the declining cost of electricity generated by photovoltaic surfaces.

[image]It appears that cost parity with present residential electricity rates is finally imminent. Also, migration to solar power could happen rapidly before full cost parity due to tax breaks, and the fact that solar energy is generated at the time of day when electricity rates are already the highest.

For reference, below is a chart of US solar intensity. It is quite possible that by 2020, many homes in the southern US will have photovoltaic surfaces on their rooftops. This, combined with the spread of plug-in hybrids and fully electric vehicles (including those from Tesla motors, which come with their own included solar panel), will lead to a fascinating simultaneous shift from a portion of coal consumption to renewables (solar, wind), and from a portion of petroleum consumption to electricity. So solar would indirectly eat into a small slice of oil consumption.



Related :

[A Future Timeline for Energy](#)

The Top Ten Transhumanist Technologies

The Futurist · 25 August 2007 · Archived copy · Original

The Lifeboat Foundation has a special report detailing their view of [the top ten transhumanist technologies](#) that have some probability of 25 to 30-year availability. [Transhumanism](#) is a movement devoted to using technologies to transcend biology and enhance human capabilities.

I am going to list out each of the ten technologies described in the report, provide my own assessment of high, medium, or low probability or mass-market availability by a given time horizon, and link to prior articles written on The Futurist about the subject.

10. Cryonics : 2025 - Low, 2050 - Moderate

I can see the value in someone who is severely maimed or crippled opting to freeze themselves until better technologies become available for full restoration. But outside of that, the problem with cryonics is that very few young people will opt to risk missing their present lives to go into freezing, and elderly people can only benefit after revival when or if age-reversal technologies become available. Since going into cryonic freezing requires someone else to decide when to revive you, and any cryonic 'will' may not anticipate numerous future variables that could complicate execution of your instructions, this is a bit too risky, even if it were possible.

9. Virtual Reality : 2012 - Moderate, 2020 - High

[The Technological Progression of Video Games](#)

[The Next Big Thing in Entertainment, Part I, II, and III](#)

[The Mainstreaming of Virtual Reality](#)

8. Gene Therapy : 2015 - Moderate, 2025 - High

The good news here is that gene sequencing techniques continue to become faster due to the computers used in the process themselves benefiting from Moore's Law. In the late 1980s, it was thought that the human genome would take decades to sequence. It ended up taking only years by the late 1990s, and today, would take only months. Soon, it will be cost-effective for every middle-class person to get their own personal genome sequenced, and get customized medicines made just for them.

[Are you Prepared to Live to 100?](#)

7. Space Colonization : 2025 - Low, 2050 - Moderate

While this is a staple premise of most science fiction, I do not think that space colonization may ever take the form that is popularly imagined. Technology #2 on this list, mind uploading, and technology #5, self-replicating robots, will probably appear sooner than any capability to build cities on Mars. Thus, a large spaceship and human crew becomes far less efficient than entire human minds loaded into tiny or even microscopic robots that can self-replicate. A human body may never visit another star system, but copies of human minds could very well do so.

Nonetheless, if other transhumanist technologies do not happen, [advances in transportation speed may enable space exploration in upcoming centuries](#).

6. Cybernetics : 2015 - High

Artificial limbs, ears, and organs are already available, and continue to improve. Artificial and enhanced muscle, skin, and eyes are not far.

5. Autonomous Self-Replicating Robots : 2030 - Moderate

This is a technology that is frightening, due to the ease at which humans could be quickly driven to extinction through a malfunction that replicates rouge robots. Assuming a disaster does not occur, this is the most practical

means of space exploration and colonization, particular if the robots contain uploads of human minds, as per #2.

4. Molecular Manufacturing : 2020 - Moderate, 2030 - High

This is entirely predictable through the Milli, Micro, Nano, Pico curves.

3. Megascale Engineering (in space) : 2040 - Moderate

From the Great Wall of China in ancient times to Dubai's Palm Islands today, man-made structures are already visible *from* space. But to achieve transhumanism, the same must be done *in* space. Eventually, **elevators extending hundreds of miles into space**, space stations much larger than the current ISS (240 feet), and vast orbital solar reflectors will be built. But, as stated in item #7, I don't think true megascale projects (over 1000 km in width) will happen before other transhumanist technologies render the need for them obsolete.

2. Mind Uploading : 2050 - Moderate

This is what I believe to be the most important technology on this list. Today, when a person's hardware dies, their software in the form of their thoughts, memories, and humor, necessarily must also die. This is impractical in a world where software files in the form of video, music, spreadsheets, documents, etc. can be copied to an indefinite number of hardware objects.

If human thoughts can reside on a substrate other than human brain matter, then the 'files' can be backed up. That is all there is to it.

1. Artificial General Intelligence : 2050 - Moderate

This is too vast of a subject to discuss here. Some evidence of progress appears in unexpected places, such as when, in 1997, IBM's Deep Blue defeated Gary Kasparov in a chess game. Ray Kurzweil believes that an artificial intelligence will pass the Turing Test (a bellwether test of AI) by 2029. We will have to wait and see, but expect the unexpected, when you least expect it.

Film-Quality Animation on the Average PC

The Futurist · 8 September 2007 · Archived copy · Original

I happened to see [this story on MIT Technology Review](#) :

Now, Adobe Systems, the company famous for tools like Photoshop and Acrobat Reader, is developing software that could bring the power of a Hollywood animation studio to the average computer and let users render high-quality graphics in real time. Such software could be useful for displaying ever-more-realistic computer games on PCs and for allowing the average computer user to design complex and lifelike animations.

The **Impact of Computing** mandates that any computationally driven product or capability exponentially drops in cost by 30% to 60% every year. Each film that was considered to be a breakthrough in computer-derived special effects, from Toy Story to the Lord of the Rings Trilogy, used technology that continues to become commoditized. What was groundbreaking from Pixar in 1995 is today affordable to second-tier video game companies designing games on \$2 million budgets, and television programs intended for syndication and cable. Before long, the prices inevitably reach the consumer.

Needless to say, this greatly enhances the reach of the nascent cottage industry of Machinima, and eventually will lead to small groups of 2-3 people producing full-length animated feature films that can be distributed on the Internet. I have written about this in detail in my article from 4/1/2006, [The Next Big Thing in Entertainment](#), particularly in [Part II](#). This development from Adobe is one of the necessary steps towards realizing the vision that I outlined in the original article. Machinima will be to Hollywood what the blogosphere became to Big Media.

Related :

[The Next Big Thing in Entertainment](#)

[The Technological Progression of Video Games](#)

[The Impact of Computing](#)

[Next Generation Graphics - A Good Intro](#)

VMWare and the Next Silicon Valley Wealth Cycle

The Futurist · 9 September 2007 · Archived copy · Original

When Google conducted an IPO in August of 2004, it was the first multibillion-dollar offering for a Silicon Valley company after the deep recession of 2001-03. Google achieved a market capitalization of over \$20 billion on the first day, and several hundred employees became millionaires. The infusion of new money into Silicon Valley was a major factor in shaking off the final stages of the preceding bust. Today, Google's market cap stands at over \$160 billion.

Now, almost exactly 3 years later, another company called VMWare (VMW) has had an IPO, achieving a market capitalization of \$23 billion, bringing overnight riches to many employees. Amazingly, VMWare was acquired by EMC for just \$635 Million in December of 2003. That means the valuation of the company has risen about about 36X in just over 3.5 years, in a sector of technology that very few people are familiar with.

VMWare's business is entirely different from Google's, but its effect on Silicon Valley will be similar. An infusion of billions of dollars of cash into the ecosystem causes tremors in the tectonic plates of the Valley. The event refills venture capitalist coffers which, in turn, fertilizes the Valley to grow thick with another wave of startups. The cycle thus begins anew.

Without fail, major liquidity events like this have occurred after intervals no longer than 4 years, even if there is a steep downturn in between (as in 2001-03). There have been other, smaller IPOs in recent months, such as Cavium Networks (CAVM), Aruba Networks (ARUN), and Infinera (INFN), each weighing in at between \$1.1 and \$1.5 Billion. The next cycle has begun in earnest. Let's see where it takes us.

The Way Is Hsut

The Futurist · 10 September 2007 · Archived copy · Original

This has nothing to do with futurism, but I could not resist joining the contest being held at [Beltway Blogroll](#) - a frenzy in creating puns applicable to fraudster Norman Hsu.



I recall a scene in Lord of the Rings, the Return of the King, where Aragorn, Legolas, and Gimli go into the [Paths of the Dead](#), and meet the King of the Dead, who, as the Army of the Dead surrounds the heroes, chants, "The Way is Shut".

The same applies for the accomplices and beneficiaries of the previously elusive scam artist Norman Hsu. Regarding those who were accustomed to receiving these ill-gotten funds, The Way is Hsut, and it can't be a positive development for Hillary Clinton's campaign. Hsu himself skipped his court date to flee, but managed to stay on the lam for just two days, after which his fugitive path to freedom was hsut as well. He forfeited the \$2 million he posted as bail, which is the minimum that he deserves.

I am tempted to expand on something along the lines of "Blue Suede Hsus" or "Hsu Hsu Sudeo", but I'll leave that to the more skilled comics.



Update : However, I can't let the "My...preHsuous" opportunity go by.

BusinessWeek Slideshow : 10 Green Technologies That Could Change Your Life

The Futurist · 15 September 2007 · Archived copy · Original

View BusinessWeek' slideshow over [here](#). I must point out that my [Future Timeline for Energy](#), written back on February 25, 2007, has described many of the items that BusinessWeek noticed some 7 months later. In fact, the following articles go back even earlier :

[CFLs and LEDs](#) : September 25, 2006

[Tesla Roadster](#) : December 26, 2006

This is not the first time an article here on The Futurist was written months before BusinessWeek featured the same technology. My article [Terrorism, Oil, Globalization, and the Impact of Computing](#), from August 22, 2006, predated a BusinessWeek [slideshow on the same topic](#) released on February 20, 2007, or 6 months later. View the slideshow [here](#).

Why I Want Oil to Hit \$120 per Barrel

The Futurist · 1 October 2007 · Archived copy · Original

Here on The Futurist, we have a long tradition of seeking permanent independence from oil-drunk dictatorships and theocracies, with the pursuit of long-term gains taking precedence over the avoidance of short-term pain. I refer you to :

[Why \\$70/barrel Oil is Good for America \(February 1, 2006\).](#)

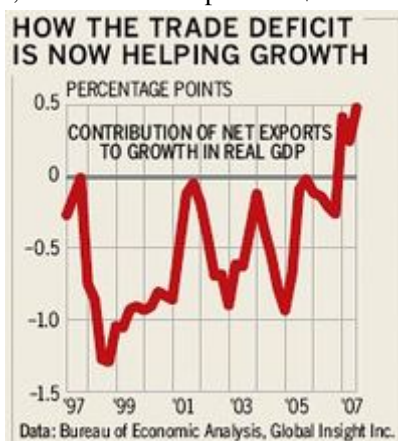
[\\$70+/Barrel Oil, the Non-Crisis \(April 25, 2006\).](#)

[Terrorism, Oil, Globalization, and the Impact of Computing \(August 22, 2006\).](#)

When oil first hit \$70/barrel nearly two years ago, there were widespread fears of the US economy tipping into recession. I pointed out that a much smaller piece of the US economy has exposure to oil than was the case in 1974 or 1981, which were the last times such high prices were seen (in inflation-adjusted terms). Google, Oracle, and VMWare are far less vulnerable to oil prices than General Motors and Federal Express. Sure enough, after 2 years of oil prices hovering around \$70, the US economy has successfully adapted to it. The specter of the \$70 barrier is behind us, permanently. This [chart from the Bureau of Labor Statistics](#) shows the annualized rate of oil price inflation over the last few years.



Notice how the rise from \$20 to \$80 led to import price inflation (the blue line) touching 10% for three years. However, that rise is now behind us, with the settled price of \$70/barrel or more no longer causing further inflation



in the price of imported products.

Even more striking is the shrinkage in the US trade deficit. Despite oil imports being as much as one third of the US trade deficit of about \$60 Billion/month, the trade deficit has actually shrunk since the peak of 2006, [contributing positively to GDP growth for the first time](#)

in over a decade (chart from BusinessWeek). **That the US economy can now take \$70 and even \$80 oil in stride is the biggest story that no one has noticed yet.**

However, \$70 oil also fattens the coffers of the world's notorious 'Petrotyrants'. From Iran to Venezuela to Saudi Arabia to Russia, one can note **that there is a rather close correlation between an economy being heavily dependent on oil exports and the leaders of that country resisting or even rescinding democracy.**

Thomas Friedman has many interesting articles on the subject, such as his '**Fill 'Er Up With Dictators**' :

But as oil has moved to \$60 to \$70 a barrel, it has fostered a counterwave — a wave of authoritarian leaders who are not only able to ensconce themselves in power because of huge oil profits but also to use their oil wealth to poison the global system — to get it to look the other way at genocide, or ignore an Iranian leader who says from one side of his mouth that the Holocaust is a myth and from the other that Iran would never dream of developing nuclear weapons, or to indulge a buffoon like Chávez, who uses Venezuela's oil riches to try to sway democratic elections in Latin America and promote an economic populism that will eventually lead his country into a ditch.

But Mr. Friedman is a bit self-contradictory on which outcome he wants, as evidenced across his New York Times columns.

Over here, he says :

In short, the best tool we have for curbing Iran's influence is not containment or engagement, but getting the price of oil down

And here, he says :

So here's my prediction: You tell me the price of oil, and I'll tell you what kind of Russia you'll have. If the price stays at \$60 a barrel, it's going to be more like Venezuela, because its leaders will have plenty of money to indulge their worst instincts, with too few checks and balances. If the price falls to \$30, it will be more like Norway. If the price falls to \$15 a barrel, it could become more like America

Yet over here he says :

Either tax gasoline by another 50 cents to \$1 a gallon at the pump, or set a \$50 floor price per barrel of oil sold in America. Once energy entrepreneurs know they will never again be undercut by cheap oil, you'll see an explosion of innovation in alternatives.

As well as over here :

And by not setting a hard floor price for oil to promote alternative energy, we are only helping to subsidize bad governance by Arab leaders toward their people and bad behavior by Americans toward the climate.

All of these articles were written within a 4-month period in early 2007. Both philosophies are true by themselves, but they are mutually exclusive. Mr. Friedman, what do you want? Higher oil prices or lower oil prices?

But forget about Mr. Friedman wanting it both ways. Instead, I am going to go with the second choice, that of higher oil prices. I see this as a golden opportunity for permanent, far-reaching, multifaceted geopolitical change. The US economy has successfully adapted to a permanent \$70/barrel oil price with almost no real pain, and thus it is the time to take the bull by the horns, and lure the Petrotyrants into the ultimate irreversible trap.

It is time to hope that the price of oil rises to \$120/barrel by 2010, and stays above that level permanently.

Why, you may ask? Won't such a high price make Iran, Venezuela, Saudi Arabia, Russia, Nigeria, Sudan, Kazakhstan, and others even wealthier, without them having done anything to earn it? Won't it make Sudan more genocidal, and Iran more able to equip terrorists? Won't Saudi Arabia be able to fund even more Madrasas across the world?

Sure it will, for a time. *But consider the perils of burning the candle at both ends.*

But won't this also cause economic suffering in the US? For a time, yes. Gasoline will be at \$5/gallon, and the trade deficit will temporarily widen. I claim the possible recession will be brief, if there even is one at all, as the run-up from the present price of \$80/barrel up to \$120/barrel is already less of a shock than the jump from \$20 to \$80 that we already have successfully sustained. I say all of this is worthwhile short-term pain, **for when the quietly toiling engine of technological innovation emerges from its chrysalis**, it will be gigantic.

The technological climate of 2007 is very different from that of 1974 or 1981. **There is so much breadth and depth in energy innovation right now**, even at the present \$70-\$80/barrel, that \$120/barrel will move the technology and economics of alternative energy into fast-forward. Currently, the petroleum market is shielded from exposure to both the electricity market and the agricultural market. However, upcoming electric and plug-in hybrid automobile technologies consume electricity at an equivalent cost of just \$1/gallon. Furthermore, electricity can be generated from multiple sources that exist in almost every country, eliminating the weak position that oil importers are in relative to oil exporting nations. With gasoline at \$5/gallon, consumers will migrate towards hybrids, plug-in hybrids, and electric vehicles so rapidly that the auto manufacturers will start engaging in aggressive competition to lower prices and accelerate innovation. This will greatly widen the fronts at which the oil market is exposed to the far cheaper and decentralized electricity market. This spells trouble for oil producers who have to compete with electricity that is 3-5X cheaper in providing the same transportation.

Simultaneously, cellulosic and algae-derived ethanol research efforts will get supercharged, greatly increasing the probability of a breakthrough that enables the attractive math of cellulose or algae to replace the unimpressive economics of corn ethanol. If ethanol from switchgrass or algae is more compelling than oil at \$120/barrel, oil has yet another enemy in addition to electricity. The combination of electric vehicle and cellulose/algae ethanol technologies will act as a 1-2 punch to slash the consumption of oil across both the US and China permanently within just a few short years.

Then, the fun begins. The terrorists and despots who got lured into profligate spending under \$120 oil will eventually find that the demand for their exports is plummeting. Furthermore, the thing about subsidies such as those that Iran doles out is that they are self-propagating. **Note that in 2005, Iran exported \$44 billion in oil, but spent \$25 billion in subsidies**, meaning that if oil fell to \$30/barrel, Iran's export revenue would effectively become zero if the same level of subsidies are maintained. 34 cent/gallon gasoline leads to more car purchases and hence more demand for gasoline, increasing the cost of maintaining the subsidies, and hence the oil price floor at which Iran's export revenues would shrink to zero. At \$120/barrel, the subsidy obligation will be so burdensome that even a drop back down to \$70/barrel would lead to a revenue falling behind expenses. At the same time, China will have no choice but to aid in the hastening of these technological advances, as they will have to shift their priorities from locking up oil contracts to reducing the crushing cost of oil imports at \$120/barrel.

On the other hand, if oil stays at or below \$70/barrel for the long term, Petrotyrants will survive to continue their nefarious activities for at least another 20 years to come. China, too, will continue their current stance of propping up Petrotyrants.

Thus, I say *bring \$120 on*. We outspent the Soviet Union on defense, and we can outspend the Petrotyrants while setting them up for an inevitable cornering and collapse. Give me \$120/barrel oil by 2010, and I will give you the demise of Petrotyranny in Russia, Iran, and Venezuela by 2015. Count on it.

Update (10/19/07) : We're up to \$90/barrel already! While there will be ups and downs in the traded daily price, and the gloomy media coverage might appear frightening, be patient and disciplined. The short-term pain will lead

to permanent long-term gain.

Update (5/22/08) : Oil has crossed \$120/barrel, and is currently as high as \$133. Such a rapid rise usually is followed by a precipitous drop, and we need the price to stay above \$120 for an extended period to realize the benefits described in the article. I might do a v 2.0 in 2008 itself if the price stays high.

Related :

[A Future Timeline for Automobiles](#)

[A Future Timeline for Energy](#)

[Terrorism, Oil, Globalization, and the Impact of Computing](#)

The Futurist's Stock Portfolio for 2008.

The Futurist · 11 November 2007 · Archived copy · Original

Early this year, I presented my 2007 portfolio, which will be evaluated on December 31, 2007, in relation to the performance of the S&P500 index.

I am now going to present my 2008 portfolio, which is to be tracked over the remaining 13+ months between now and the end of 2008, again in relation to the S&P500 index. The hypothetical portfolio of \$100,000 will be invested in exchange-traded securities and mutual funds that reflect what I believe to be an optimal portfolio construction for 2007. We will, at the end of the period, see how the portfolio tracks the broader market. Dividends will be re-invested.

So the portfolio is :

Security	Symbol	Percentage
iShares Russell 2000 Value	IWN	50%
iShares EAFE Value	EFV	20%
Morgan Stanley India Investment Fund	IIF	15%
Cisco Systems	CSCO	5%
Activision	ATVI	5%
Google	GOOG	5%
		100%

This is a simpler portfolio, with less emphasis on gaming, and more on fundamental value-based principles. The selections represent general principles and specific predictions outlined in the previously written articles :

[The Next Big Thing in Entertainment, Part I](#), [Part 2](#), and especially [Part 3](#)

[The Culture of Success and Stock Market Capitalization in Developing Countries](#)

[The Stock Market is Exponentially Accelerating too](#)

I hereby sign and seal this portfolio, bought at the prices on November 9, 2007, to be evaluated on the last trading day before December 31, 2008.

The Futurist's Stock Portfolio for 2007 - RESULTS

The Futurist · 12 January 2008 · Archived copy · Original

On January 23, 2007, I created an investment portfolio to be frozen at that time, and evaluated on December 31, 2007 against the benchmark of the S&P500 index. The portfolio incorporated principles, economic trends, and technologies discussed in other articles here on The Futurist. Dividends were reinvested, and so the price paid reflects dividend-adjusted cost-basis. Yahoo and Google Finance do tend to miss recording some dividends, so one must go to a more reliable site like Morningstar to account for the exact dividends.

So how did the portfolio do? I achieved a return of **13.3%**, vs. just **4.3%** for the S&P500, from January 23 to December 31. Most fund managers are unable to beat the S&P500 index despite the advanced tools at their disposal. The fraction of those that can beat the index by a margin 9.0 percentage points is even more exclusive, putting this portfolio in the top 10% of all mutual fund results for this period.

Security	Symbol	Percentage	1/23/07 Price Paid	12/31/07 Price	% Change	Points
iShares Russell 2000 Value	IWN	30%	78.19	70.5	-9.8%	27.0%
iShares Cohen and Steers Realty	ICF	20%	102.68	79.14	-22.9%	15.4%
Morgan Stanley India Investment Fund	IIF	20%	36.2	54.9	51.7%	30.3%
Fidelity New Markets Income Fund	FNMI	10%	13.81	14.68	6.3%	10.6%
Electronic Arts	ERTS	5%	49.76	58.4	17.4%	5.9%
Activision	ATVI	5%	17.55	29.7	69.2%	8.5%
THQ Inc	THQI	5%	33.34	28.2	-15.4%	4.2%
GameStop	GME	5%	27.46	62.11	126.2%	11.3%
		100%			Total Return	13.3%
S&P500 Index						4.3%

As always, weightage matters just as much as stock-picking. The first two securities, amounting to 50% of my portfolio, were a total disaster. In fact, when I first created the portfolio, I listed **FXI** as a security that was strongly considered but left out. FXI returned an eye-popping 83% over the same period, so if I had included FXI instead of ICF, the portfolio's total return would have exceeded 25%. But it was not included, so 'what ifs' do not count.

The India Investment Fund (IIF) was a star, more than compensating for the failure of the first two securities. But the real home runs came from the video game stocks. Three of the four outperformed the S&P500, and two of those, Activision and GameStop, surged into the stratosphere. My selection and detailed analysis of this sector way back on April 17, 2006 yielded a spectacular payoff. As a quartet, these 4 gaming stocks returned a combined 49% over this period.

So there you have it. Futurism is not impossible after all. I have already started my 2008 portfolio, and we shall see how that goes on December 21, 2008. The same principles covered in the articles below, are being applied. Let us see if the success can be repeated or exceeded.

The Next Big Thing in Entertainment, Part I, Part 2, and especially Part 3

The Culture of Success and Stock Market Capitalization in Developing Countries

The Stock Market is Exponentially Accelerating too

(cross-posted at TechSector)

2007 Technology Breakthrough Roundup

The Futurist · 12 January 2008 · Archived copy · Original

One year ago, I posted a roundup of 2006 technology breakthroughs from MIT Technology Review. Of the breakthroughs listed at that time, displays, plug-in hybrids, and solar cells showed impressive progress over the subsequent 12 months.

Now, we arrive at the 2007 list, which has expanded from four categories last year to five this time.

The Year in Software

The Year in Hardware : Gadgetmania

The Year in Energy : Solar power inches closer.

The Year in Biotechnology : Stem cell research methods that no longer need embryos.

The Year in Nanotechnology : Stanford University research into nanowires that dramatically increase battery capacity is the most promising breakthrough of 2007, in any discipline. Think 30-hour laptop batteries.

Most of the innovations in the articles above are in the laboratory phase, which means that about half will never progress enough to make it to market, and those that do will take 5 to 15 years to directly affect the lives of average people (remember that the laboratory-to-market transition period itself continues to shorten in most fields). But each one of these breakthroughs has world-changing potential, and that there are so many fields advancing simultaneously guarantees a massive new wave of improvement to human lives.

This scorching *pace* of innovation is entirely predictable, however. To internalize the true rate of technological progress, one merely needs to appreciate :

The Milli, Micro, Nano, Pico curves

The Impact of Computing

The Accelerating Rate of Change

We are fortunate to live in an age when a single calendar year will invariably yield multiple technological breakthroughs, the details of which are easily accessible to laypeople. In the 18th century, entire decades would pass without any observable technological improvements, and people knew that their children would experience a lifestyle identical to their own. Today, we know with certainty that our lives in 2008 will have slight but distinct and numerous improvements in technological usage over 2007, just as 2007 was an improvement over 2006.

Into the Future we continue, where 2008 awaits..

(cross-posted at TechSector).

US Recession Began in December 2007

The Futurist · 5 February 2008 · Archived copy · Original

The US government usually declares a recession only several months after it has begun. I find the [Economic Cycle Research Institute](#) to be a vastly more reliable source of leading indicators. While the ECRI has still not declared a recession as 'unavoidable', the economic data of the last week tells me that it is, indeed, not just unavoidable at this point, but that it actually began in December 2007. It is far too late for any 'stimulus' to prevent a recession, nor will the EU manage to avoid hardship of its own.

When I identified the pervasive nature of the Housing Bubble way back on April 13, 2006, I stated that housing may do poorly in inflation-adjusted terms even for the next 20 years (until 2026). Few were convinced then, now only somewhat more are. But supporting data for my prediction of the housing bubble being an event of generational duration is accumulating steadily.

Furthermore, when the US economy was not at any risk of recession on November 4, 2006, I wrote an extended piece to refute the broken clocks who always insist the US is on the brink of collapse. I declared that if recession does not happen by the end of 2007, then the housing bubble will no longer be a cause of recession, due to the housing correction being lengthy (hence digestible) rather than sharp. As the recession began in December 2007, we missed passing into the safety zone by just a hair.

As the question of recession is now in the past, the next question is when a recovery may take place. The drop in economic conditions between October and January was so steep, and the Federal Reserve's reduction in rates in January, while belated, was so large in magnitude, that GDP recovery may arrive as soon as Q4. But I am not making a prediction on recovery timing yet.

Update (3/20/08) : The ECRI has officially declared the economy to be in recession, six weeks after The Futurist. (Crossposted on TechSector).

Related :

[The Housing Bubble - 20-Year Gains May Never be Repeated](#)

Nine Tantalizing Small Companies

The Futurist · 17 February 2008 · Archived copy · Original

In scouring the startup universe for the companies and technologies that can reshape human society and create entirely new industries, one has to play the role of a prospective Venture Capitalist, yet not be constrained by the need for a financial exit 3-6 years hence.

Therefore, I have assembled a list of nine small companies, each with technologies that have the potential to create trillion-dollar economic disruptions by 2020, disruptions that most people have scarcely begun to imagine today. Note that the emphasis is on the technologies rather than the companies themselves, as a startup requires much more than a revolutionary technology in order to prosper. Management skills, team synergy, and execution efficiency are all equally important. I predict that out of this list of nine companies, perhaps one or two will become titans, while the others will be acquired by larger companies for modest sums, enabling the technology to reach the market through the acquiring company.

1) **NanoSolar** : NanoSolar produces low-cost solar cells that are manufactured by a process analogous to 'printing'. The company's technology was selected by Popular Mechanics as the '**Innovation of the Year**' for 2007, and Nanosolar's solar cells are significantly ahead of the **Solar Energy Cost Curve**. The flexible, thin nature of Nanosolar's cells may enable them to be quickly incorporated onto the surfaces of many types of commercial buildings. Nanosolar's first shipments have already occurred, and if we see several large deployments in the near future, this might just be the company that finally makes solar energy a mass-adopted consumer technology. Nanosolar itself calls this the '**third wave**' of solar power technology.

2) **Tesla Motors** : I wrote about Tesla Motors in late 2006. Tesla produces fully electric cars that can consume as little as 1 cent of electricity per mile. They are about to deliver the first few hundred units of the \$98,000 Tesla Roadster to customers, and while the Roadster is not a car that can be marketed to average consumers, Tesla intends to release a 4-door \$50,000 sedan named 'WhiteStar' in 2010, and a \$30,000 sedan by 2013. The press coverage devoted to Tesla Motors has been impressive, but until the WhiteStar sedan successfully sells at least 10,000 units, Tesla will not have silenced critics who say the technology cannot be brought down to mass-market costs.



3) **Aptera Motors** : When I first wrote about Tesla Motors, it was before I had heard about Aptera Motors. While Tesla is aiming to produce a \$30,000 sedan for 2013, Aptera already has an all-electric car due for late 2008 that is priced at just \$27,000, while delivering the equivalent of between 200 and 330 mpg. The fact that the vehicle has just three wheels may reduce mainstream appeal to some degree, but the futuristic appearance of the car will attract others. Aptera Motors is a top candidate for winning the **Automotive X-Prize** in 2010.

The simultaneous use of Nanosolar's solar panels with the all-electric cars from Tesla and Aptera may enable automotive driving to be powered by *solar* generated electricity for the average single-family household. The combination of these two technologies would be the 'killer ap' of getting off of oil and onto fully renewable energy for cars.

Related : **Why I Want Oil to Hit \$120/Barrel**.

4) **23andMe** : This company gets some press due to the fact that co-founder Anne Wojcicki is married to Sergey

Brin, even as Google has poured \$3.9M into 23andMe. Aside from this, what 23andMe offers is an individual's personal genome for just \$1000. What a personal genome provides is a profile of which health conditions the customer is more or less susceptible to, and thus enables the customer to provide this information to his physician, and make the preventive lifestyle adjustments well in advance. Proactive consumers will be able to extend their lifespans by systematically reducing their risks of ailments they are genetically predisposed to. As the service is a function of computational power, the price of a personal genome will, of course, drop, and might become an integral part of the average person's medical records, as well as an expense that insurance covers.

5) **Desktop Factory** : In 2008, Desktop Factory will begin to sell a \$5000 device that functions as a 3-D printer, printing solid objects one layer at a time. A user can scan almost any object (including a hand, foot, or head) and reproduce a miniature model of it (up to 5 X 5 X 5 inches). The material used by the 3-D printer costs about \$1 per cubic inch.

The \$5000 printer is a successor to similar \$100,000 devices used in mechanical engineering and manufacturing firms. Due to the **Impact of Computing**, consumer-targeted devices costing under \$1000 will be available no later than 2014. I envision an ecosystem where people invent their own objects (statuettes, toys, tools, etc.) and share the scanned templates of these objects on social networking sites like MySpace and Facebook. People can thus 'share' actual objects over the Internet, through printing a downloaded template. The cost of the printing material will drop over time as well. A lot of fun is to be had, and expect an impressive array of brilliant ideas to come from people below the age of 16.

6) **Zazzle** : Welcome to the age of the instapreneur. Zazzle enables anyone to design their own consumer commodities like T-shirts, mugs, calendars, bumper stickers, etc. on demand. If you have an idea, you can produce it on Zazzle with no start-up costs, and no inventory risks. You profit even from the very first unit you sell, with no worries about breakeven thresholds. You can produce an infinite number of products, limited only by your imagination. At this point, those of you reading this are probably in the midst of an avalanche of ideas of products you would like to produce.

While the bulk of Zazzle users today are would merely be vanity users who manage to sell under ten units of their creations, this new paradigm of low-cost customization will inevitably creep up to major industrial supply chains. Even more interesting, think about #5 on this list, Desktop Factory, combining with Zazzle's application, into an amazing transformation of the very economics of manufacturing and mass-production.

7) **A123 Systems** : [Read here about how battery technology is finally set to advance after decades of stagnation.](#) A123 Systems is at the forefront of these advances, and has already received over \$148 Million in private funding, as well as [an article from the prestigious MIT Technology Review](#). [A123 is a supplier for GM's upcoming Volt, and has already has begun to sell a module to convert a Toyota Prius into a plug-in hybrid.](#) For choices beyond those offered by the #2 and #3 companies on this list, A123 Systems is poised to enable the creation of many new electric or plug-in hybrid vehicles, greatly increasing the the choices available to consumers seeking the equivalent of more than 50 mpg. A123 may just become the Intel of batteries. Combine A123's batteries with Nanosolar's cells, and the possibilities become even more interesting.

8) **Luxim** : Brightness of light is measured in Lumens, not Watts, which is a measure of power consumption. [Consumers are learning that CFL and LED bulbs offer the same Lumens with just a fifth or a tenth of the Watts consumed by a traditional incandescent bulb](#), and billions of tons of coal are already being saved by the adoption of CFLs and LEDs. Luxim, however, aims to take this even further. Luxim makes tiny bulbs that deliver 8 times as many Lumens per Watt as incandescent bulbs. The bulbs are too expensive for home use, but are already going into projection TVs. With \$61 Million in funding to date, Luxim's main hurdle will be to reduce the cost of their products enough to penetrate the vast home and office lighting market, which consumes tens of billions of bulbs each year.

9) **Ugobe** : Ugobe sells a robotic dinosaur toy known as the Pleo. A mere toy, especially a \$350 toy, would not normally be on a list of technologies that promise to crease the fabric of human society. However, a closer look at

the Pleo reveals many impressive increments in the march to make inexpensive robots more lifelike. The skin of the Pleo covers the joints, the Pleo has more advanced 'learning' abilities than \$2500 robots from a few years ago, and the Pleo even cries when tortured, to the extent that it is difficult to watch this.

The reason Ugobe is on this list is that I am curious to see what is the next product on their roadmap, so that I can gauge how quickly the technology is advancing. The next logical step would be an artificial mammal of some sort, with greater intelligence and realistic fur. The successful creation of this generation of robot would provide the datapoints to enable us to project the approximate arrival of future humanoid robots, for better or for worse. Another company may leapfrog Ugobe in the meantime, but they are currently at the forefront of the race to create low-priced robotic toys.

This concludes the list of nine companies that each could greatly alter our lives within the next several years. Of these nine, at least three, Nanosolar, Tesla Motors, and 23andMe, have Google or Google's founders as investors. The next 24 months have important milestones for each of these companies to cross (by which time I might have a new list of new companies). For those that clear their respective near-term bars, there might just be a chance of attaining the dizzy heights that Google, Microsoft, or Intel has.

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(crossposted on TechSector)

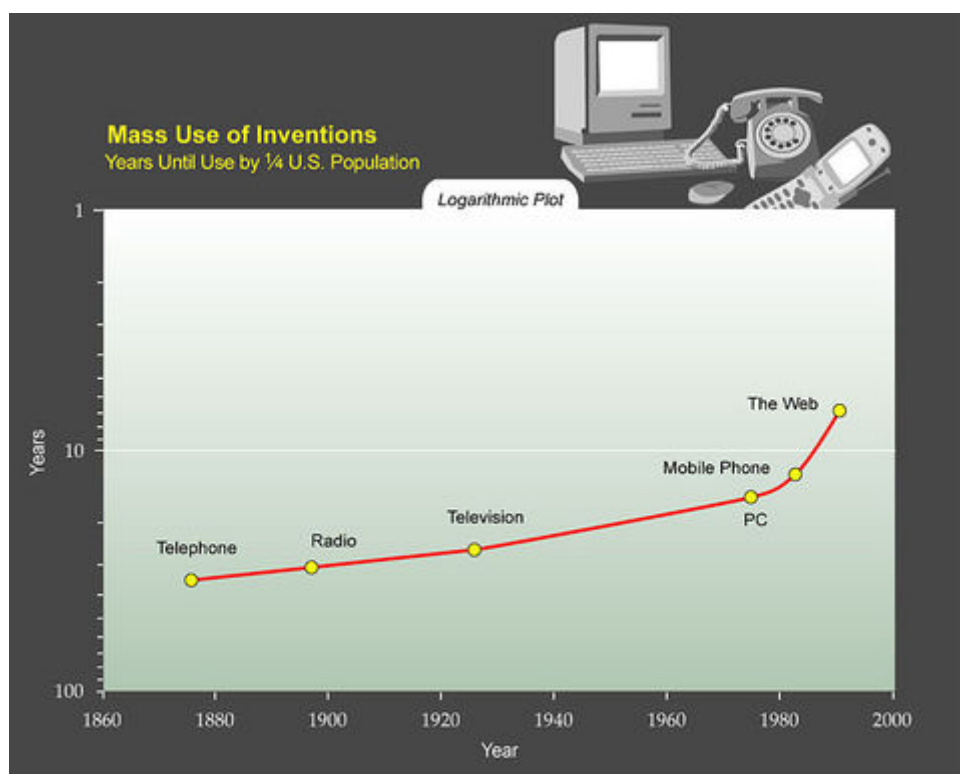
Is Technology Diffusion in a Lull?

The Futurist · 19 February 2008 · Archived copy · Original

There are minor but growing elements of evidence that the rate of technological change has moderated in this decade. Whether this is a temporary trough that merely precedes a return to the trendline, or whether the trendline itself was greatly overestimated, will not be decisively known for some years. In this article, I will attempt to examine some datapoints to determine whether we are at, or behind, where we would expect to be in 2008.

There is overwhelming evidence that **many seemingly unrelated technologies are progressing at an accelerating rate**. However, the exact magnitude to the accelerating gradient - the second derivative - is difficult to measure with precision. Furthermore, there are periods where advancement can be significantly above or below any such trendline.

This brings us to the chart below from Ray Kurzweil ([from Wikipedia](#)) :



This chart appears prominently in many of Kurzweil's writings, and brilliantly conveys the concept of how each major consumer technology reached the mainstream (as defined by a 25% US household penetration rate) in successively shorter times. The horizontal axis represents the year in which the technology was invented.

This chart was produced some years ago, and therein lies the problem. If we were to update the chart to the present day, which technology would be the next addition after 'The Web'?

Many technologies can claim to be the ones to occupy the next position on the chart. iPods and other portable mp3 players, various Web 2.0 applications like social networking, and flat-panel TVs all reached the 25% level of mainstream adoption in under 6 years in accordance with an extrapolation of the chart through 2008. However, it is debatable that any of these are 'revolutionary' technologies like the ones on the chart, rather than merely increments above incumbent predecessors. The iPod merely improved upon the capacity and flexibility of the walkman, the plasma TV merely consumed less space than the tube TV, etc. The technologies on the chart are all *infrastructures* of some sort, and it is clear that after 'The Web', we are challenged to find a suitable candidate for the next entry.

Thus, we either are on the brink of some overdue technology emerging to reach 25% penetration of US households

in 6 years or less, or the rapid diffusion of the Internet truly was a historical anomaly, and for the period from 2001 to 2008 we were merely correcting back to a trendline of much slower diffusion (where it take 10-15 years for a technology to reach 25% penetration in the US). One of the two has to be true, at least for an affluent society like the US.

This brings us to the third and final dimension of possibility. This being the decade of globalization, **with globalization itself being an expected natural progression of technological change**, perhaps a US-centric chart itself was inappropriate to begin with. Landline telephones and television sets still do not have 25% penetration in countries like India, but mobile phones jumped from zero to 10% penetration in under 7 years. The oft-cited 'leapfrogging' of technologies that developing nations can benefit from is a crucial piece of technological diffusion, which would thus show a much smaller interval between 'telephones' and 'mobile phones' than in the US-based chart above. Perhaps '10% Worldwide Household Penetration' is a more suitable measure than '25% US Household Penetration', which would then possibly show that there is no lull in worldwide technological adoption at all.

I may try to put together this new worldwide chart. The horizontal axis would not change, but the placement of datapoints along the vertical axis would. Perhaps Kurzweil merely has to break out of US-centricity in order to strengthen his case and rebut most of his critics.

The future will disclose the results to us soon enough.

(crossposted on TechSector)

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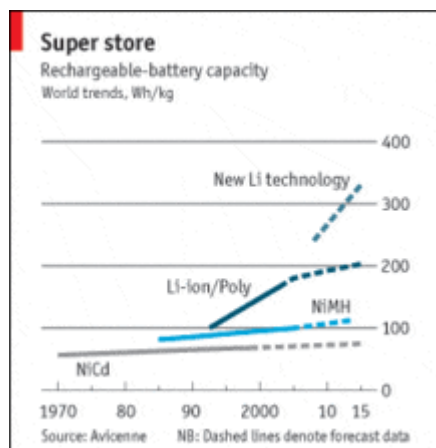
[Are You Acceleration Aware?](#)

[The Impact of Computing](#)

[These are the Best of Times](#)

Batteries Set to Advance, Finally

The Futurist · 11 March 2008 · Archived copy · Original



The Economist has a great article on the history and near-future outlook for battery technology. Batteries have scarcely improved in the last century, and there have been too many false starts for a seasoned observer to get his hopes up too easily. But this chart of battery capacity by unit weight, in particular, is something I have been seeking for a long time. It vindicates my belief that lithium-ion technology is improving at a rate far faster than traditional nickel batteries (that have scarcely improved at all in the last half-century). Note, importantly, that if we join the multiple curves, we see a strong indication of the classic accelerating technology exponential curve. This time we know it's for real.

This is exciting on multiple levels, because it opens the door to not just mainstream electrical vehicles in the next decade, but to a variety of wearable electronic devices, 20-30 hour laptop batteries, household robotics, and other applications that have not yet been imagined.

Future projections are usually over-optimistic, you say? Let's also not forget Stanford University's nanowire research to increase Lithium-ion battery capacity, which was widely acclaimed as among the most important scientific breakthroughs of 2007.

Related :

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[A Future Timeline for Automobiles](#)

[Why I Want Oil to Hit \\$120 per Barrel](#)

'Outsourcing' - What a Non-Crisis That Turned Out to Be, v2.0

The Futurist · 18 March 2008 · Archived copy · Original

I wrote version 1.0 of this article on November 26, 2006. 16 months later, it is time for version 2.0 to provide more historical context on how misplaced the hype over some fashionable issues eventually turns out to be, and why what once appeared to be a harbinger of doom is now all but forgotten.

In the 2001-03 economic downturn, the aftermath of the technology bust resulted in hundreds of thousands of software engineers and assorted high-tech workers losing their jobs. A jittery public was vulnerable to influence from isolationist politicians, with the likes of Lou Dobbs and Pat Buchanan fanning the flames in the media. As a result, the simple business practice of moving certain components of daily operations to a lower-cost location, if only to keep up with competitors already doing the same, became a dirty word - 'outsourcing'.

The cover story of Wired Magazine's February 2004 issue was on the outsourcing of software jobs to India. Within the article, a core theme was the supposedly tremendous hardships that white-collar Americans were about to experience due to a 'giant sucking sound' of jobs going to India. In the same month, then Presidential candidate John Kerry screamed about the practices of "Benedict Arnold CEOs" who outsource American jobs to India, hoping to gain the support of isolationists and the economically ignorant. Elsewhere, very uncharitable things were said by leftists about brown-skinned Indians, due to their rapid adoption of capitalism and globalization at the expense of the leftist plantation where Indians were required to symbolize Gandhian non-violence, zen spirituality, yoga, curries, and the glorification of poverty.

Let's call February 2004 as time when the bubble of 'outsourcing' fears reached a fevered peak. Now, what happens whenever a bubble of psychology reaches a peak?

A quick glance at a few economic indicators from the Bureau of Labor Statistics in the 4 years since then reveals the following :

US Economy	February-04	February-08	Notes
Unemployment Rate	5.6%	4.8%	
Total US Jobs	130,439,000	137,993,000	7.5 Million jobs created
Hourly Wage	\$15.54	\$17.80	14.5% increase in 4 years

So 7.5 million jobs were created in this short time, the unemployment rate is lower than it has been for 33 of the last 37 years, and wages have risen while real GDP has grown at a 3.2% clip. There is thus no evidence of job losses, wage erosion, or underemployment over this period. Take that, Lou Dobbs, Pat Buchanan, John Kerry, Dennis Kucinich, and other assorted demagogues, who have no ability whatsoever to truly grasp the trends that shape our world.

India, in the meantime, has benefited greatly as well. GDP growth has averaged 8% a year over this same period, pulling 100 million people out of poverty. Political ties with the US have strengthened in a manner unlike any previous episode in the last 50 years. The faster these ties broaden, the better the world will become. A prosperous India is a critical component to the US achieving favorable outcomes in both the War on Terror and with China, as seen from where India resides on this particular map. Anti-Americans become apoplectic when they learn that India is the most pro-US country in the world.

What does the future of outsourcing hold? Is there still a risk of jobs vanishing from the US at a rate faster than they can be produced, as pessimists still maintain? Unlikely, even though Internet backbone bandwidth has quintupled in the last 4 years, and many more people in India have PCs and Broadband connections today than in early 2004. This is because aggregate demand growth has saturated even India's vast labor pool. Salaries in India have been rising at over 12% a year due to labor shortages, causing their cost advantage to erode. The Wired article from 2004 stated that the average salary of an Indian programmer was \$8000 a year; today, it is closer to \$15,000 a year in US dollars. India itself has started outsourcing to Bangladesh and Eastern Europe, which are much smaller

labor pools and will also saturate quickly. Indeed, the trends favor more job creation in America *and* India.

Now that we are in another recession, phony issues like this one emerge again. Democrats are still speaking in protectionist tones, bashing NAFTA and opposing free-trade agreements with Columbia. But other than a few pessimists, socialists, and racists, it is unlikely to gain much traction, as Americans have seen that the benefits have outweighed the costs by a handsome margin. [BusinessWeek](#) also had an article from 4/24/07, six months after version 1.0 of this article was post, on how misrepresented the outsourcing issue is.

Thus, the bubble of fashionable pessimism has moved to the next topic, which happens to be the decline of the dollar. This, too, will turn out to be a passing concern that the economy adjusts to after a brief period of pain. Among other things, a competitively priced dollar has led to Europe outsourcing jobs *to* the US, and is also working towards reducing US dependence on oil. A debunking of the 'weak dollar' fad will be posted on another day.

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[Terrorism, Oil, Globalization, and the Impact of Computing](#)

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[Outsourced Education - the Latest Flattener](#)

How Far Can 'Medical Tourism' Go?

The Futurist · 21 March 2008 · Archived copy · Original

Studying what lies beneath the surface of market forces can be fascinating.

[BusinessWeek](#) has a [slideshow depicting major centers for medical tourism, as well as the cost savings of various procedures in relation to the US](#). This got me thinking about several dimensions of this concept, particularly since healthcare is 15% of the US economy, yet is also the sector of the US economy, outside of government, where wastage and inefficiencies are the greatest.

Many procedures that cost \$100,000 or more in the US can be done with equal competence for \$10,000 in Thailand or India. Normally, if something of comparable quality is available for just a tenth of the cost, demand migrates to the cheaper alternative in a huge torrent. Even after accounting for travel costs, the gulf is immense. Yet it appears that only a small percentage of US patients for cardiovascular surgery, joint replacements, etc. are going overseas for their operations. Medical tourism will still only earn a miniscule \$4 Billion in 2008 for India, Thailand, and Singapore combined, of which only one-third is from American patients. Thus, only a fraction of a percent of the US, European, and Japanese healthcare sectors have been dented.

This, of course, can be due to two reasons :

- a) Fears about quality/safety, either real or perceived.
- b) Net out-of-pocket cost to the patient still being lower in the US, due to insurance.

Regarding quality, many of these surgeons are certified by US boards or even educated in US colleges, and accidents do not appear to happen at any greater rate than in the US. At the same time, it is not possible to pursue malpractice suits against facilities in India or Thailand, which, while certainly an element of risk, itself is part of the reason for their lower price relative to the US. It is inevitable that some mishap befalls an American patient in Asia, and the media latches onto the story for a week or more, reversing the market demand for medical tourism for years, even if the incidence of such tragedies may be no more than in US hospitals. In fact, I am surprised it has not happened already.

In terms of cost, that brings us to the elephant in the room, which is the revelation that it is not India or Thailand that are too cheap, but rather that US healthcare is too expensive to begin with. I am no expert in this field, but it seems obvious that a lack of market forces in the value chain, a lack of regulation of lawsuits, the horrendous dietary habits of most Americans, and the tendency of consumers to not care about how much the insurance company pays are all contributory factors to what is arguably the greatest tragedy in US economic history. Socializing the healthcare system will worsen it, for reasons too vast to delve into here. It is true that many Canadians come to the US for urgent procedures that would require a 3-month wait in Canada.

However, millions of Americans don't have health insurance at all, and while for some this is by choice, for some it is not. For them, traveling abroad for a \$10,000 heart procedure may be the only affordable option. Even if the most experienced and well-frequented facilities are in India and Thailand, nearby options also exist in Jamaica and Costa Rica. Over 20 other countries across Eastern Europe, Asia, and Latin America are also vying for a slice of the pie.

As unintended consequences ripple through, herein lies the path to forcing some degree of reform of the US healthcare system. As more Americans either choose or are forced to seek low-cost procedures abroad, even if it is only a small percentage American patients, this will compel insurance companies to include medical tourism options to patients. The insurance company can offer their own version of malpractice insurance to the patient, cover all travel expenses for the patient and spouse, and even throw in a vacation package and cash incentive. Even after all this, if the cost of the \$10,000 procedure in India or Thailand has now risen to \$30,000, it still outcompetes the \$100,000 US alternative handily. [Some insurance companies are already starting this with enthusiasm, and](#)

before long, all insurance companies will effectively have to compete on this level.

As the number of Americans combining surgeries with a tropical vacation becomes a small but significant percentage of the total patient pool, the US healthcare system will have no choice but to undertake the difficult reforms to bring costs down at a systemic level, *thus benefiting even those Americans who refuse to go overseas, and even procedures that are not candidates for offshoring*. If software development can be outsourced to India where it is one fourth the cost, surgeries cannot expect to be perpetually immune to competition that is a tenth or twentieth of the cost. Through some combination of tort reform, free-market principles, and preventative focus, US costs will gradually be brought down closer to a market rate. Perhaps the US can comfortably sustain prices that are 3 times that of Thailand, but not 10 times. This will be the next industry in the US that is forced to adapt.

To review, the expected sequence of events is :

- 1) Americans with no insurance are forced to make a life or death decision to get their surgeries abroad, where the service meets or exceeds their expectations.
- 2) More insurance companies offer medical tourism with liability guarantees and cash/vacation incentives to American patients. Only a small fraction of patients are adventurous enough to do this, but all insurance companies are compelled to offer these options.
- 3) Major centers for medical tourism, after a track record of about a decade, develop solid brands that can attract American patients.
- 4) When we finally get to the point that 10% of Americans are traveling abroad for a wide array of procedures, the US will be forced to begin to take measures to reduce costs throughout the healthcare system. Losing 10% of the market is all that it will take to force some positive changes. This could begin to happen by 2020.

Such a sequence of events, of course, will boost the US economy greatly. Of the \$2 Trillion mentioned above, as much as half of that, a whopping \$1 Trillion or 7% of the US economy, is estimated to be wastage incurred due to a shortage of market forces in healthcare. Imagine if that \$1 Trillion could be redeployed elsewhere. A person who saves \$90,000 on a heart procedure can choose to use that money on emerging innovations in biotechnology that may be available in the 2020s, *such as treatments to slow down or halt some aspects of aging*.

This is not going to be a trend that moves as quickly as some of the others discussed here on The Futurist. But the economics involved are massive enough that it has certainly caught my eye. Let's see what happens, both before and after the predicted media frenzy over a foreign medical mishap.

Update (4/3/08) : *Businessweek has an article on how technological advances in medical instrumentation are enabling some surgical procedures to be done with far tinier incisions*. Patients who previously would have to stay in the hospital for a week to recover now can leave in under a day.

The article also mentions how hospitals are opposed to these technological advancements, as they reduce the number of days of revenue a hospital can collect while a patient recovers after surgery. This anti-productive, entitlement mentality will hasten the downfall of the US healthcare cartel, as shorter recovery times due to smaller incisions will make a trip to a tech-friendly facility in Thailand or India even more compelling. When the cost is a tenth *and* the recovery time is a fifth of what it would be in the US, how long before market forces dominate?

Actuarial Escape Velocity

The Futurist · 25 March 2008 · Archived copy · Original

Every now and then, an obscure concept is so brilliantly encapsulated in a compact yet sublime term that it leaves the audience inspired enough to evangelize it.

I have felt that way ever since I heard the words 'Actuarial Escape Velocity'.

For some background, please refer to an older article from early 2006, '[Are You Prepared to Live to 100?](#)'. Notice the historical uptrend in human life expectancy, and the accelerating rate of increases. For more, do also read the article "[Are You Acceleration Aware?](#)".

In analyzing the rate at which life expectancy is increasing in the wealthiest nations, [we see that US life expectancy is now increasing by 0.2 years, every year](#). Notably, [the death rates from heart disease and cancer have been dropping by a rapid 2-4% each year](#), and these two leading causes of death are quickly falling off, despite rising obesity and a worsening American diet over the same period. [Just a few decades ago, the rate on increase in life expectancy was slower than 0.2 years per year](#). In the 19th century, even the wealthiest societies were adding well under 0.1 years per year. But how quickly can the rate of increase continue to rise, and does it eventually saturate as each unit of gain becomes increasingly harder to achieve?

Two of the leading thinkers in the field of life extension, Ray Kurzweil and [Aubrey de Grey](#), believe that by the 2020s, human life expectancy will increase by more than one year every year (in 2002 Kurzweil predicted that this would happen as soon as 2013, but this is just another example of him consistently overestimating the rate of change). This means that death will approach the average person at a slower rate than the rate of technology-driven lifespan increases. It does not mean all death suddenly stops, but it does mean that those who are not close to death do have a possibility of indefinite lifespan after AEV is reached. David Gobel, founder of the [Methuselah Foundation](#), has termed this as *Actuarial Escape Velocity (AEV)*, essentially comparing the rate of lifespan extension to the speed at which a spacecraft can surpass the gravitational pull of the planet it launches from, breaking free of the gravitational force. Thus, life expectancy is currently, as of 2007 data, rising at 20% of Actuarial Escape Velocity.

I remain unconvinced that such improvements will be reached as soon as Ray Kurzeil and Aubrey de Grey predict. I will be convinced after we clearly achieve 50% of AEV in developed countries, where six months are added to life expectancy every year. It is possible that the interval between 50% and 100% of AEV comprises less than a decade, but I'll re-evaluate my assumptions when 50% is achieved.

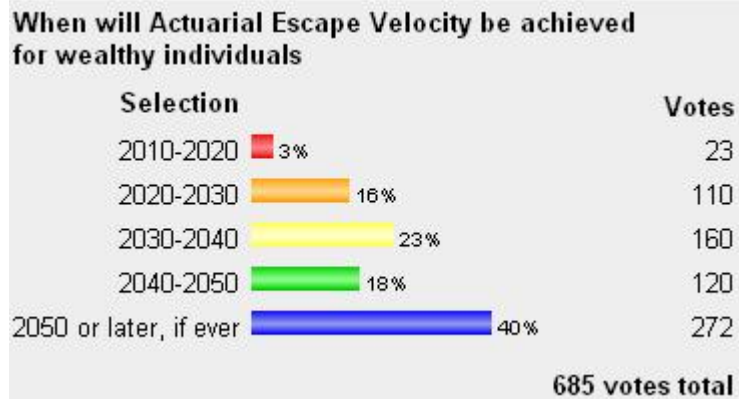
Serious research efforts are underway. The [Methuselah Mouse Prize](#) will award a large grant to researchers that can demonstrate substantial increases in the lifespan of a mouse ([more from The Economist](#)). Once credible gains can be demonstrated, funding for the research will increase by orders of magnitude.

The enormous market demand for lifespan extension technologies is not in dispute. There are currently 95,000 individuals in the world with a net worth greater than \$30 million, including 1125 billionaires. [Accelerating Economic Growth](#) is already growing the ranks of the ultrawealthy at a scorching pace. If only some percentage of these individuals are willing to pay a large portion of their wealth in order to receive a decade or two more of healthy life, particularly since money can be earned back in the new lease on life, then such treatment already has a market opportunity in the hundreds of billions of dollars. The reduction in the economic costs of disease, funerals, etc. are an added bonus. Market demand, however, cannot always supercede the will of nature.

This is only the second article on life extension that I have written on The Futurist, out of 154 total articles written to date. While I certainly think aging will be slowed down to the extent that many of us will surpass the century mark, it will take much more for me to join the ranks of those who believe aging can be truly reversed. To track progress in this field, keep one eye on the rate of decline in cancer and heart disease deaths, and another eye on the [Methuselah Mouse Prize](#). That such metrics are even advancing on a yearly basis is already remarkable, but

monitoring anything more than these two measures, at this time, would be premature.

So let's find out what the group prediction is, with a poll. Keep in mind that most people are biased towards believing this date will fall within their own lifetimes (poll closed 7/1/2012) :



A Rebuttal to 'Peak Oil' Doomsday Predictions

The Futurist · 28 March 2008 · Archived copy · Original

At The Oil Drum, a detailed article by 'Gail the Actuary' speculates on how declining production of oil combined with rising demand will cause an economic catastrophe, leading to the global economy contracting so severely, that by 2040 it is much smaller than it is today. The author actually believes that in 2040, most people will no longer be able to afford cars, electricity will be unreliable, and goods and services will be fewer and rarer than today.

Another article submitted by an different contributor on The Oil Drum arrives at the same pessimistic conclusion, stating that 'economic growth will end one way or another'. Most of the commenters on both articles are in a groupthink state of agreement that can best be described as a Maoist-Malthusian cult.

I would normally not bother to rebut something like this, except that this particular essay is so stunningly wrong and annoyingly pessimistic, despite the seemingly meticulous research the author has conducted, that I am compelled to dissect how insulated groupthink can spiral into a zone where even the most extreme conclusions are accepted.

Note that I happen to be someone who actually does believe in Peak Oil theory, but that such a condition generates long-term positives that outweigh short-term negatives.

The assumptions that the 'Peak Oil' doomsday scenario makes are :

- 1) That rising oil prices do not cause a long-term downward adjustment in demand. Oil demand may be inelastic in the short-term, but in the long term, people will buy more efficient cars, carpool, ride bicycles, reduce discretionary trips, conduct more commerce online, etc. To assume otherwise is to ignore the most basic law of economics. This is before even accounting for the indirect benefits of declining oil demand such as a drop in traffic fatalities (which cost \$2 million apiece to the economy), less wear and tear on roads and tires, less pollution, less real estate consumed by gas stations, less competition for parking spaces, etc.
- 2) That rising grain prices will not move consumption away from increasingly expensive meat towards affordable grains, fruits, and vegetables, thereby reducing grain and water demand. This, too, is economic illiteracy. If the price of beef triples while the price of rice and potatoes does not, consumption patterns shift.
- 3) That there will be very little technological innovation in alternative energy, automobile efficiency, batteries, or information technology from this point on. In fact, there is innovation in all of those areas, so we have multiple layers of protection against the doomsday scenario, as detailed by these articles :

[A Future Timeline for Energy](#)

[A Future Timeline for Automobiles](#)

[Batteries Set to Advance, Finally](#)

[Solar Energy Cost Curve](#)

[Terrorism, Oil, Globalization, and the Impact of Computing](#)

- 4) That most economic growth is not in knowledge-based industries, which consume far less energy per dollar of output. The US economy today produces twice the financial output per unit of oil consumption as it did in 1975, with information technology rising as a portion of total economic output.

- 5) That a major economic downturn, featuring skyrocketing food prices for people in poorer countries, will somehow not translate to a lower birth rate that inhibits population growth and hence curbs demand, and that population projections will somehow not change.

- 6) That there will be no humans living beyond the Earth (whether in orbit or on the Moon) by 2040. The reason this point is relevant is because a society cannot advance in space travel without simultaneous advances in energy technology. I say that advances in photovoltaic efficiency make Lunar colonies closer to viability by that time. _____

7) That we are going to have over 30 years of negative growth in World GDP, despite not having had a single year of negative growth since 1973, and despite the trendline of growth solidly registering at 4.5% a year even today. I happen to think that by 2040, the world economy will be 4 times larger than it is today. Even the Great Depression was only 5 years of negative growth, followed by a recovery that elevated prosperity to levels higher than they were in 1929, at a time when World GDP was only at a trendline of 2% annual growth, or less than half the level of today. Yet Gail the Actuary thinks car ownership will no longer be affordable to most people by 2040.

Peak oil may be on the horizon, but the US economy has already adapted to oil at sustained prices of \$70 or \$80/barrel (which is the biggest story that no one is noticing yet), and will soon adapt to \$100/barrel. I want oil to hit a sustained \$120/barrel by 2010 to start a virtuous cycle of technological and geopolitical chain reactions that make the world a better place in the long term. If oil hits \$200/barrel, that will cause a deep recession that could last several years, but after that point, we will have adapted out of the oil burden almost entirely, and World GDP growth will resume at 5% a year.

Could I be wrong and they be right? Well, let us first see if oil rises substantially above \$120/barrel, and if that year has negative World GDP.

Does anyone feel like defending the doomsday prediction from The Oil Drum?

Energy vs. Financials, A Divergence of Historical Extremes

The Futurist · 22 April 2008 · Archived copy · Original

Energy and Financials are both large sectoral components of the S&P500. Yet the two have diverged immensely over the last 2 years. Not since the technology bust at the start of the decade have any two sectors diverged so much from each other, and from the composite S&P500 index.

XLE is an exchanged-traded fund for the Energy sector, while XLF is the equivalent for the Financial sector. First, let us view a two-year chart :



Energy has outperformed the S&P500 by an equal margin that Financials have lagged the S&P500 by. Next, we can view a five-year chart :



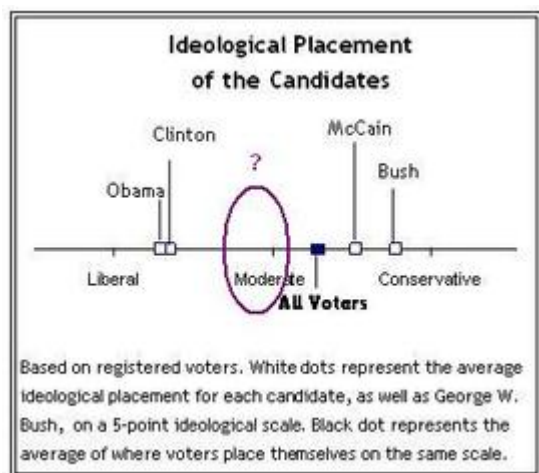
While Financials only began to fall away in 2007, Energy has gone so high above the composite market that it reminds one of the technology bubble of the late 1990s.

It seems quite obvious here that while it is impossible to identify the exact top of the Energy run, or the exact bottom of the Financials correction, it would be very prudent to sell any existing holdings in Energy (or even short Energy if you have the appetite) and rotate the proceeds into Financials. The gap could widen in the short term, but rarely do two sectors reach such extreme disparities that make a profitable trade so obvious.

(crossposted on [TechSector](#)).

US Ideological Distribution, 2008

The Futurist · 3 May 2008 · Archived copy · Original



The Pew Research Center has presented a simple linear chart that places the ideology of the three Presidential contenders and the current President on a left-right scale, along with the median ideology of the voting public. A two-axis chart would be more informative, but this one-dimensional distribution reveals a great deal :

1) The center of gravity of the US public is significantly right of the center, no matter what leftists may say/wish. McCain, thus, is far closer to the center of gravity than Bush, who in turn is closer than Obama or Clinton. The GOP is far less dependent on centrists to win elections than Democrats are.

2) The notion that McCain is 'not conservative enough' does not stand up to statistical evidence. Those who whine about McCain's support for amnesty of illegals or compromises on judicial appointments forget that even Ronald Reagan did three things that were not purely conservative.

- a) Reagan granted amnesty to illegals in 1986
- b) Reagan appointed two moderate Supreme Court Justices, Kennedy and O'Connor, and only one conservative, Scalia.
- c) Reagan did increase income taxes, after first lowering them

No President will be purely conservative, nor should he/she be. So I reject the initial conservative hostility to McCain (which seems to have somewhat abated). The job of a political party is to win elections, and the fact that Republicans span a wider ideological spectrum than Democrats should be a source of pride, which brings us to observation #3.

3) The Democratic Party has been enslaved by fringe leftists. Obama and Clinton are nearly identical in ideology, yet very far to the left of the center of gravity. The purple oval I have inserted, along with the question mark, represents a vacuum in the moderate left. A large number of voters clearly reside there, but the Democratic party of today will not nominate someone who resides in the purple zone, leaving these voters as ideological orphans.

Thus, Clinton and Obama have to lie (assisted by a complicit leftist media) to appear more moderate than they are, and hope that the public doesn't figure that out.

Joseph Lieberman, the VP candidate against Bush/Cheney just seven years ago, was run out of the Democratic Party simply for not being opposed to bringing democracy to Iraq. Bill Clinton's actions of supporting free trade agreements like NAFTA, sending troops to fight proto-Al-Qaeda terrorists in Somalia in 1993, reforming welfare, cutting taxes on capital gains in 1997, attacking Saddam Hussein to remove his WMD programs in 1998, etc. are all actions that the modern Democratic party would not take.

I am a political moderate, in that I care about only three issues. These are, in order of importance to me :

- a) aggressively fighting against terrorists and other enemies of democracy and women's rights,
- b) the preservation of free market meritocracy, and the use of market forces to solve problems, and
- c) a judicial system that punishes crime, instead of ignoring justice and proceeding to reward the criminal as a poster-child for some perverted cause.

I have a neutral/uninterested position on abortion, gay marriage, gun ownership, prayer in schools, and many other domestic issues. Yet, I am considered 'right wing' by some extreme leftists, on account of holding the above three positions alone. Until 2001, it did not even occur to me that only one of the two parties still advocates these three basic principles - I assumed that these were values held by any logical person. I wish I had a true choice between two parties, but I don't. In the words of once-Democrat Ronald Reagan, I did not move away from the Democratic Party, it moved away from me.

The moderate left died in 1968, when two of their most promising young leaders were assassinated. Since then, **Democrats have only won three of the last ten elections.** After the disaster of Jimmy Carter, Democrats never again won 50% of the popular vote in SEVEN attempts, while Republicans achieved this feat 4 times over that period (1980, 84, 88, 2004). This is a truly shambolic performance from the Democrats of the modern era. Jimmy Carter did more to ensure a generation of GOP dominance than Reagan, Gingrich, Limbaugh, or Rove ever could.

Furthermore, **Democrats are not capable of getting a majority of voters who earn over \$30,000 a year.** The middle class earning between \$50,000 and \$75,000 voted just 44% for Democrats. A party that is soundly rejected by the middle class and upper class is not positioned for long-term success.

2008 is a year where more factors, from a weak economy to an unpopular incumbent, are working against Republicans than at any time since 1976. Thus, Democrats should be in a position to win by a landslide, but even now are trailing in the polls, and have at best a 50/50 chance of winning the White House in November, with a nominee far more distant from the voting public than John McCain is. Even if, say, Obama wins, he might repeat the Carter-esqe phenomenon of ensuring another generation of GOP dominance starting from 2012. If 2008 is 1976, 2012 could be 1980.

Once again, the job of a political party is to attract the votes of 50% of the public, and Democrats can only hope to achieve this by fluke. If Democrats want to become a national party again, they must move into the purple zone, period. I sincerely want them to do this, as this will force the GOP to compete to become a better party as well, rather than stagnate into mediocrity with the knowledge that they only have to be better than the most pathetic of opponents.

When will Democrats purge the leftists and move to the center?

Ten Biotechnology Breakthroughs Soon to be Available

The Futurist · 9 May 2008 · Archived copy · Original

Popular Mechanics has assembled one of those captivating lists of new technologies that will improve our lives, this time on healthcare technologies (via Instapundit). Just a few years ago, these would have appeared to be works of science fiction. Go to the article to read about the ten technologies shown below.



Most of these will be available to average consumers within the next 7-10 years, and will extend lifespans while dramatically lowering healthcare costs (mostly through enhanced capabilities of early detection and prevention, as well as shorter recovery times for patients). This is consistent with my expectation that **bionanotechnology** is quietly moving along established trendlines despite escaping the notice of most people. These technologies will also move us closer to **Actuarial Escape Velocity**, where the rate of lifespan increases exceed that of real time.

Another angle that these technologies effect is the globalization of healthcare. We have previously noted the success of 'medical tourism' in US and European patients seeking massive discounts on expensive procedures. These technologies, given their potential to lower costs and recovery times, are even more suitable for medical offshoring than their predecessors, and thus could further enhance the competitive position of the countries that are quicker to adopt them. If the US is at the forefront of using the 'bloodstream bot' to unclog arteries, the US thus once again becomes more attractive than getting a traditional procedure done in India or Thailand. But if the lower cost destinations also adopt these technologies faster than the heavily regulated US, then even more revenue migrates overseas and the US healthcare sector would suffer further deserved blows, and be under even greater pressure to conform to market forces. As technology once again acts as the great leveler, another spark of hope for reforming the dysfunctional US healthcare sector has emerged.

These technologies are near enough to availability that you may even consider showing this article to your doctor, or writing a letter to your HMO. Plant the seed into their minds...

Related :

[Actuarial Escape Velocity](#)

[How Far Can 'Medical Tourism' Go?](#)

[Milli, Micro, Nano, Pico](#)

Nanohealing Material Heads to Market

The Futurist · 14 May 2008 · Archived copy · Original

I first wrote on October 14, 2006 about a liquid that quickly self-assembles into a solid gel upon contact with blood, sealing the wound quickly. At that time, it appeared that military use of this type of substance was 8-10 years away from 2006. However, it appears that progress has accelerated, and we are much closer to market availability than it initially appeared. [An update on the progress is posted this week in MIT Technology Review.](#)

The material consists of naturally occurring amino acids that have been engineered to form peptides that spontaneously cluster together to create long fibers when exposed to salty, aqueous environments, such as those found in the body. The fibers form a mesh that serves as a physical barrier to blood and other fluids.

Needless to say, this could save many lives on the battlefield, in car crashes, and during surgery. If it becomes inexpensive enough, it could even be part of home first-aid kits. Arch Therapeutics is the company that is licensing the technology from MIT, and clinical trials are set to begin soon.

Let's hope the next hurdles are quickly cleared.

The Solar Revolution is Near

The Futurist · 20 May 2008 · Archived copy · Original

I have long been optimistic about Solar Energy (whether photovoltaic or thermal) becoming our largest energy source within a few decades. Earlier articles on the subject include :

[A Future Timeline for Energy](#)

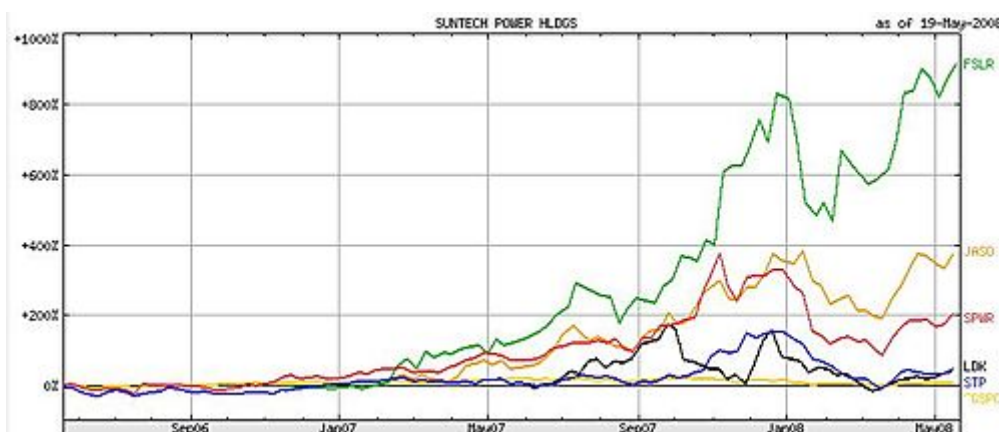
Solar Energy Cost Curve

Several recent events and developments have led me to reinforce this view. First of all, [consider this article from Scientific American, detailing a Solar timeline to 2050](#). The article is not even Singularity-aware, yet details many steps that will enable Solar energy to expand by orders of magnitude above the level that it is today. Secondly, two of the most uniquely brilliant people alive today, Ray Kurzweil and Elon Musk (who I recently chatted with), have both provided compelling cases on why Solar will be our largest energy source by 2030. Both Kurzweil and Musk reside in significantly different spheres, yet have arrived at the same prediction.

However, the third point is the one that I find to be the most compelling. There are a number of publicly traded companies selling solar energy products, many of which had IPOs in just the last three years. Some of these companies, and their market capitalizations, are :

Company	Symbol	Mkt. Cap (\$Bill)
FirstSolar	FSLR	\$24.0
Sunpower	SPWR	\$7.0
SunTech Power	STP	\$7.0
LDK Solar	LDK	\$4.3
JA Solar	JASO	\$3.8
SolarFun Power	SOLF	\$1.2
Evergreen Solar	ESLR	\$1.1

Now consider that the companies on this list alone amount to about \$50 Billion in capitalization. There are, additionally, many smaller companies not included on this list, many companies like Applied Materials (AMAT) and Cypress Semiconductor (CY) for which solar products comprise only a portion of their business, and large private companies like NanoSolar ([which I have heavily profiled here](#)) and SolFocus that may have valuations in the billions. Thus, the market cap of the 'solar sector' is already between \$60B and \$100B, depending on what you include within the total. This immense valuation has accumulated at a pace that has taken many casual observers by surprise. A 2-year chart of some of the stocks listed above tells the story.



While FirstSolar (FSLR) has been the brightest star, all the others have trounced the S&P500 to a degree that would put even Google or Apple to shame over this period. Clearly, a dramatic ramp in Solar energy is about to make mainstream headlines very soon, even if the present valuations are too high.

Is this a dot-com-like bubble? Yes, in the near-term, it is. However, after a sharp correction, the long term growth will resume for the companies that emerge as leaders. I won't recommend a specific stock among this cluster just yet, as there are a wave of private companies with new technologies that could render any of these incumbents obsolete. Specific company profiles will follow soon, but in the meantime, for more detail on the long-term trends in favor of Solar, refer to these additional articles of mine :

[Why I Want Oil to Hit \\$120 per Barrel](#)

[Terrorism, Oil, Globalization, and the Impact of Computing](#)

[\(crossposted on TechSector\)](#)

Why the US Will Still be the Only Superpower in 2030, v2.0

The Futurist · 6 June 2008 · Archived copy · Original



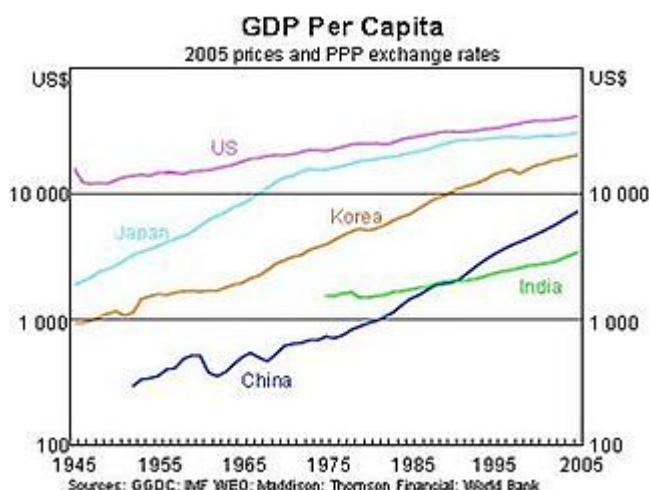
One of the most popular dinner party conversation topics is the possibility that the United States will be joined or even surpassed as a superpower by another nation, such as China. Let us assess the what makes a superpower, and what it would take for China to match the US on each pillar of superpowerdom. Two years ago, in May 2006, **I wrote the first version of this article, and it became the most heavily viewed article ever written on The Futurist.** The comments section brought a wide spectrum of critiques of various points in the article, which led me to do further research, which in turn strengthened the case in some areas while weakening it others. Thus, it is time for a tune-up on the article.

A genuine superpower does not merely have military and political influence, but also must be at the top of the economic, scientific, and cultural pyramids. **Thus, the Soviet Union was only a partial superpower,** and the most recent genuine superpower before the United States was the British Empire. Many Europeans like to point out that the EU has a larger economy than the US, but the EU is a collection of 27 countries that does not share a common leader, a common military, a uniform foreign policy, or even a common currency. The EU simply is not a country, any more than the US + Canada comprise a single country.

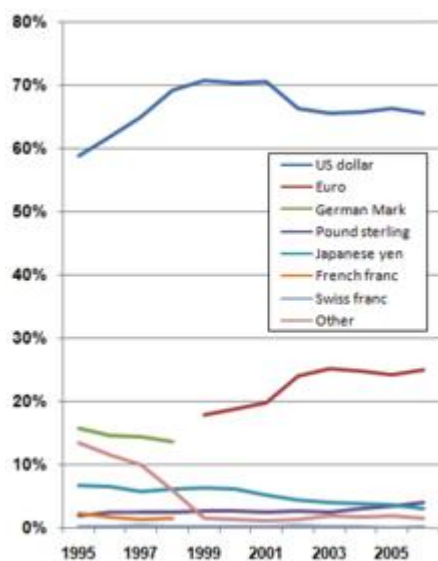
The only realistic candidate for joining the US in superpower status by 2030 is China. China has a population over 4 times the size of the US, has the fastest growing economy of any large country, and is mastering sophisticated technologies. But to match the US by 2030, China would have to :



1) Have an economy that matches the US economy in size. If the US grows by 3% a year for the next 22 years, it will be \$30 trillion in 2008 dollars by then. Note that this is a modest assumption for the US, **given the accelerating nature of economic growth,** but also note that **world GDP presently grows at a trend of 4.5% a year,** and this might at most be 6% a year by 2030. China, with an economy of \$3.2 trillion in nominal (not PPP) terms, would have to grow at 11% a year for the next 22 years straight to achieve the same size, which is already faster than its current 9-10% rate, if even that can be sustained for so long (no country, let alone a large one, has grown at more than 8% over such a long period). In other words, the progress that the US economy would make from 1945 to 2030 (85 years) would have to be achieved by China in just the 22 years from 2008 to 2030. Even then, this is just the total GDP, not per capita GDP, which would still be merely a fourth of America's.



The subject of PPP GDP arises in such discussions, where China's economy is measured to a larger number. However, this metric is inaccurate, as international trade is conducted in nominal, not PPP terms. PPP is useful for measuring *per capita* prosperity, where bag of rice in China costs less than in the US. But it tells us nothing of the size of the total economy, which could be more accurately measured in commodities like oil or gold. Nonetheless, in per capita GDP, the US surpasses any other country that has more than 10 million people (and is thus too large to rely solely on being a tax haven or tourist destination for GDP generation). From the GDP per capita chart, we can see that many countries catch up to the US, but none really can equal, let alone surpass, the US. An EU study recently estimated that the EU is 22 years behind the US in economic development. The European Chamber of Commerce estimated that the gap between the EU and US was widening further, and that it would take 75 years for the EU to catch up to the US. Again, these are official EU studies, and are thus not 'rigged by America'.



The weak dollar leads some who suddenly fancy themselves as currency experts to believe/hope that the US will lose economic dominance. However, we see from this chart that the US dollar comprises a dominant 65% of global currency reserves (an even greater share than it commanded in 1995), while the second highest share is that of the Euro (itself the combined currency of 21 separate countries) at just 25%. Furthermore, the Euro is not rising as a percentage of total reserves, despite the EU and Eurozone adding many new member nations after 2001. Which currency has any chance of overtaking the US, particularly a currency that is associated with a single sovereign nation? The Chinese Yuan represents under 2% of world reserves, and China itself stockpiles US dollars. Clearly, US dominance in this metric is enormous, and is not dwindling in the foreseeable future.



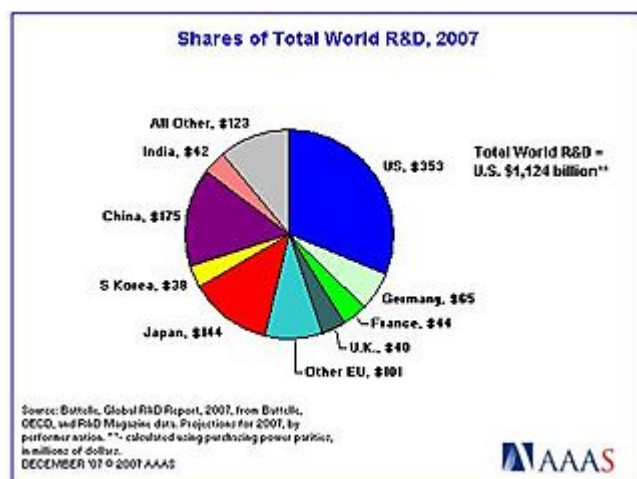
2) Have a military capable of waging wars anywhere in the globe (even if it does not actually wage any). Part of the opposition that anti-Americans have to the US wars in Afghanistan and Iraq is the envy arising from the **US being the only country with the means to invade multiple medium-sized countries in other continents and still sustain very few casualties**. No other country currently is even near having the ability to project military power with such force *and* range, despite military spending being only 3% of US GDP - a lower proportion than many other countries. Mere nuclear weapons are no substitute for this. The inability of the rest of the world to do anything to halt genocide in Darfur or other atrocities in Burma or Zimbabwe is evidence of how such problems can only get addressed if and when America addresses them.



3) Create original consumer brands that are household names everywhere in the world (including in America), such as Coca-Cola, Nike, McDonalds, Citigroup, Xerox, Microsoft, or Google. Europe and Japan have created a few brands in a few select industries, but China currently has almost none. Observing how many American brand logos have populated billboards and sporting events in developing nations over just the last 15 years, one might argue that US cultural and economic dominance has even increased by this measure.



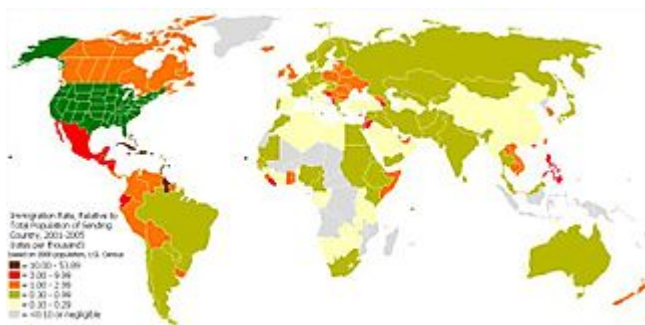
4) Have major universities that are household names, that many of the world's top students aspire to attend. 17 of the world's top 20 universities are in the US. Until top students in Europe, India, and even the US are filling out an application for a Chinese university alongside those of Harvard, Stanford, MIT, or Cambridge, China is not going to match the US in the knowledge economy. This also represents the obstacles China has to overcome to successfully conduct impactful scientific research.



5) Become the center of gravity for all types of scientific research. The US conducted 32% of all research expenditures in 2007, which was twice as much as China, and more than the 27 combined countries of the EU. But it is not just in the laboratory where the US is dominant, but in the process to deliver innovations from the laboratory to the global marketplace. To displace the US, China would have to become the nation that produces the new inventions and corporations that are adopted by the mass market into their daily lives. From the telephone and airplane over a century ago, America has been the engine of almost all technological progress. Despite the fears of innovation going overseas, the big new technologies and influential applications continue to emerge from companies headquartered in the United States. Just in the



last four years, Google emerged as the next super-lucrative company (before eBay and Yahoo slightly earlier), and the American-dominated 'blogosphere' emerged as a powerful force of information and media. Even after Google, a new batch of technology companies, this time in alternative energy, have rapidly accumulated tens of billions of dollars in market value. It is this dominance across the whole process of university excellence to scientific research to creating new companies to bring technologies to market that makes the US innovation engine virtually impossible for any country to surpass.



6) Attract the best and brightest to immigrate into China, where they can expect to live a good life in Chinese society. The US effectively receives a 'education import' estimated to be above \$200 billion a year, as people educated at the expense of another nation immigrate here and promptly participate in the workforce. As smart as people within China are, unless they can attract non-Chinese talent that is otherwise migrating to the US, and even talented Americans, they will not have the same intellectual and psychological cross-pollination, and hence miss out on those economic benefits. The small matter of people not wanting to move into a country that is not a democracy also has to be resolved. The true measure of a country is the net difference between how many people seek to enter, and how many people seek to leave. The US has a net inflow of immigrants (constrained by quotas and thus a small fraction of the unconstrained number of people who would like to enter), while China has a net outflow of native-born Chinese. Click on the map to enlarge it, and see the immigration rate to America from the world (which itself is constrained by quotas in the US and forcible restrictions on fleeing the country in places like Cuba and North Korea).



7) Be the leader in **entertainment and culture**, which is the true driver of societal psychology. China's film industry greatly lags India's, let alone America's. We hear about piracy of American music and films in China, which tells us exactly what the world order is. When American teenagers are actively pirating music and movies made in China, only then will the US have been surpassed in this area. Take a moment to think how distant this scenario is from current reality. Which country can claim the title of #2 in entertainment and cultural influence? That such a question cannot easily be answered itself shows how total US dominance in this dimension really is.



8) Be the nation that engineers many of the greatest moments of human accomplishment. The USSR was ahead of the US in the space race at first, until President Kennedy decided in 1961 to put a man on the moon by 1969. While this mission initially seemed to be unnecessary and expensive, the optimism and pride brought to anti-Communist people worldwide was so inspirational that it accelerated many other forms of technological progress and brought economic growth to free-market countries. This **eventually led to a global exodus from socialism altogether**, as the pessimism necessary for socialism to exist became harder to enforce. People from many nations still feel pride from humanity having set foot on the Moon, something which America made possible.

China currently has plans to put a man on the moon by 2024. While being only the second country to achieve this would certainly be prestigious, it would still be 55 years after the United States achieved the same thing. That is not quite the trajectory it would take to approach the superpowerdom of the US by 2030. If China puts a man on Mars or has permanent Moon bases before the US, I may change my opinion on this point, but the odds of that happening are not high.

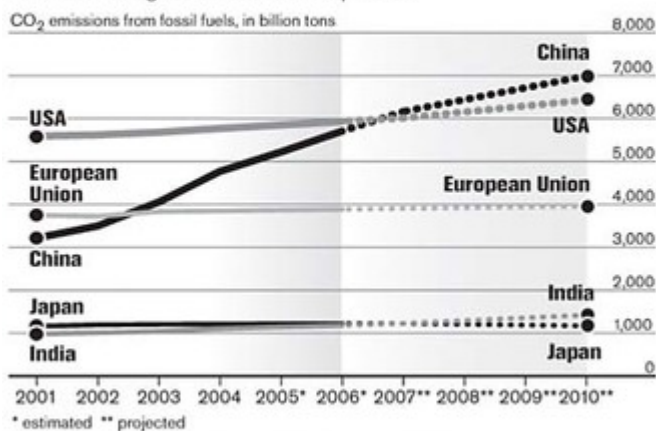
9) Be the nation expected to thanklessly use its own resources to solve many of the world's problems. It is certainly not a requirement for a superpower to be benevolent, but it does make the path to superpower ascension easier, as a malevolent superpower will receive even more opposition from the world than a benevolent one, which itself is already substantial. If the US donates \$15 billion in aid to Africa, the first reaction from critics is that the US did not donate enough. On the other hand, few even consider asking China to donate aid to Africa. After the 2004 Indian Ocean tsunami and the 2008 cyclone in Burma, the fashionable question was why the US did not donate even more and sooner, rather than why China did not donate more, despite being geographically much closer. Ask yourself this - **if an asteroid were on a collision course with the Earth, which country's technology and money would the world depend on to detect it, and then destroy or divert it?** Until China is relied upon to an equal degree in such situations, China is not in the same league.



10) Adapt to the underappreciated burden of superpowerdom - the huge double standards that a benign superpower must withstand in that role. America is still condemned for slavery that ended 140 years ago, even by nations that have done far worse things more recently than that. **America's success in bringing democracy to Afghanistan and Iraq**, and defending local populations from terrorists, is condemned more than the UN's inaction in preventing genocide and slavery. Is China prepared to apologize for **Tianenmen Square**, the genocide in Tibet, the 30 million who perished during the Great Leap Forward, and the suppression of news about SARS, every day for the next century? Is China remotely prepared for being blamed for inaction towards genocide in Darfur while simultaneously being condemned for non-deadly prison abuse in a time of war against opponents who follow no rules of engagement? **The upcoming 2008 Olympics will be an event where political demonstrations are going to grab headlines perhaps to a greater degree than the sports themselves**, and the Chinese leadership will be tested on how they deal with simmering domestic discontent under the scrutiny of the world media. The amount of unfairness China would have to withstand to truly achieve political parity with America might be prohibitive given China's history over the last 60 years.

China surging to No. 1 position

Data about China's greenhouse gas emissions has long been controversial because of the Chinese government's faulty record keeping. But new data indicate that China's emissions began to surge in 2001 and have been rising much faster than expected.



Sources: Chronicle research; China National Bureau of Statistics; International Energy Agency; U.S. Energy Information Administration

The Chronicle

Economically, is China prepared to withstand the pressures that the US presently bears? How long before the environmental movement (at least the fraction of it that is actually concerned about the environment) recognizes **that China is a bigger polluter of the atmosphere than the US is**, and that the road to pollution reduction leads straight to China? How long before China is pressured to donate aid to Africa in the manner that the US does? What happens when poorer nations benefit from Chinese R&D expenditures, particularly if those are neighboring countries that China is not friendly with?

Furthermore, China being held to the superpower standard would simultaneously reduce the burden that the US currently bears alone, allowing the US to operate with less opposition and more equitable treatment than it experiences today. Is China prepared to take on the heat? **Arguably, there is evidence that the Chinese public has not even begun to think that far.**



Of the ten points above, Britain, France, Germany, and Japan have tried for decades, and have only achieved parity with the US on maybe two of these dimensions at most. China will surpass European countries and Japan by 2030 by achieving perhaps two or possibly even three out of these ten points, but attaining all ten is something I am willing to confidently bet against. The dream of **anti-Americans** who relish the prospect of any nation, even a non-democratic one, surpassing the US is still a very distant one.



A point that many bring up is that empires have always risen and fallen throughout history. This is partly true, but note that the Roman Empire lasted for over 1000 years after its peak. Also note that the British Empire never actually collapsed since Britain is still one of the most successful countries in the world today, and the English language is the most widely spoken in the world. Britain was merely surpassed by its descendant, with whom it shares a symbiotic relationship. The US can expect the same sort of very long tail if it is finally surpassed, at some point much later than 2030 and probably not before the **Technological Singularity**, estimated for around 2050, which would make the debate moot.

That writing this article is even worthwhile is a tribute to how far China has come and how much it might achieve. I would not bother to write such an article about, say, India or Germany (the largest of the 27 EU countries). Nonetheless, there is no other country that will be a superpower on par with the US by 2030. This is one of the safest predictions The Futurist can make.

More on American Exceptionalism by Tunku Varadarajan at Forbes.

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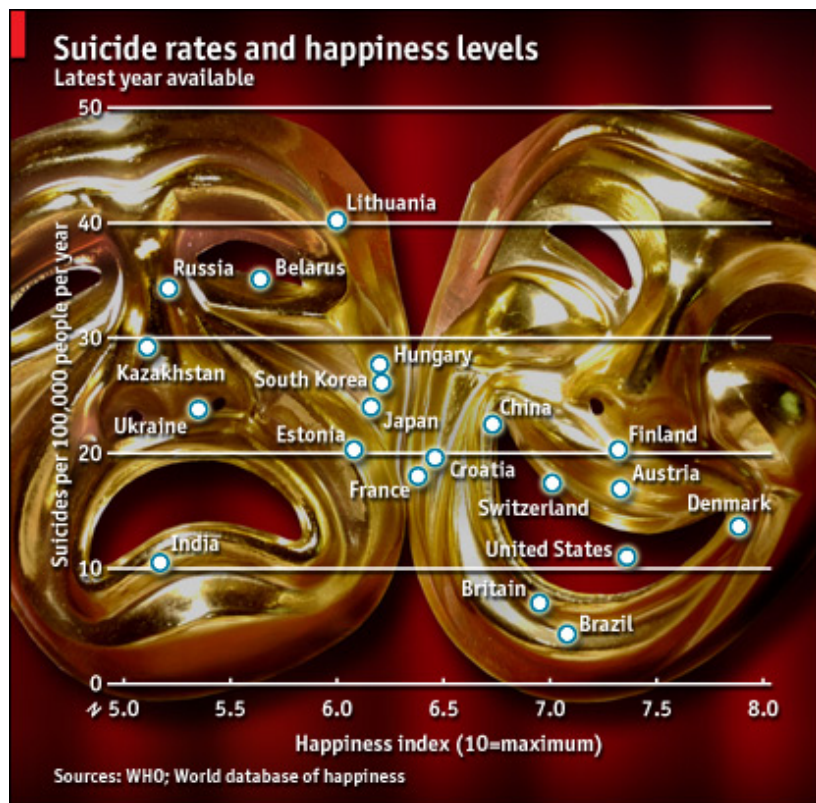
The Age of Democracy

The Culture of Success

The Culture of Happiness

The Futurist · 30 June 2008 · Archived copy · Original

This is a supplement to my article from December 2006 titled [The Culture of Success](#). In that article, I make a detailed case on how certain cultures are far more likely to produce economic prosperity than others. A recent chart from The Economist, however, adds another dimension to this thesis. Economic prosperity is not always a guarantee of happiness. So which cultures generate greater happiness?



It appears that happiness correlates moderately, but not exactly, with economic prosperity, as Japan and South Korea are less happy than Brazil. However, happiness certainly does correlate with Western values. The oldest Democracies, such as the US, Britain, Denmark, etc. are also the happiest countries.

India warrants special mention. While India is a genuine democracy, human development indicators reveal India to be one of the least successful societies in terms of wealth creation, even as it was once the world's wealthiest society for over two thousand years. However, we additionally see from the above chart that India is one of the unhappiest societies in the world. Suffice it to say that Indian culture, with thousands of years of accumulated baggage calcifying into a rocklike rigidity, has mutated into the most efficient machine imaginable for stripping away human happiness. One could scarcely invent a more sophisticated infrastructure for extinguishing the basic joys of life if they tried. The typical American, Australian, or Dane cannot even begin to imagine the sheer variety of obstacles to the pursuit of happiness that can be constructed around the human soul.

Much more will be written on this subject in the future.

Related :

[The Culture of Success](#)

Surfaces : The Next Killer Ap in Computing

The Futurist · 11 July 2008 · Archived copy · Original

Computing, once seamlessly synonymous with technological progress, has not grabbed headlines in recent memory. We have not had a 'killer ap' in computing in the last few years. Maybe you can count Wi-fi access to laptops in 2002-03 as the most recent one, but if that is not a sufficiently important innovation, we then have to go all the way back to the graphical World Wide Web browser in 1995. Before that, the killer ap was Microsoft Office for Windows in 1990. Clearly, such shifts appear to occur at intervals of 5-8 years.

I can, without hesitation, nominate surface computing as the next great generational augmentation in the computing experience. This is because surface computing entirely transforms the human-computer interaction in a matter that is more suitable for the human body than the mouse/keyboard model is. In accordance with the **Impact of Computing**, rapid drops in the costs of both high-definition displays and tactile sensors are set to bring this experience to consumers by the end of this decade.



BusinessWeek has a slideshow featuring several different products for surface computing. Over ten major electronics companies have surface computing products available. The most visible is the **Microsoft Surface**, which sells for about \$10,000, but will probably drop to \$3000 or less within 3-4 years, enabling household adoption.

As far as early applications of surface computing, a fertile imagination can yield many prospects. For example, a restaurant table may feature a surface that displays the menu, enabling patrons to order simply by touching the picture of the item they choose. The information is sent to the kitchen, and this saves time and reduces the number of waiters needed by the restaurant (as waiters would only be needed to deliver the completed orders). Applications for classroom and video game settings also readily present themselves.

Watch for demonstrations of various surface computers at your local electronics store, and keep an eye on the price drops. After seeing a demonstration, do share at what pricepoint you might purchase one. The next generation of computing beckons.

Related :

[The Impact of Computing](#)

(Crossposted on TechSector)

More on the Economics of Medical Tourism

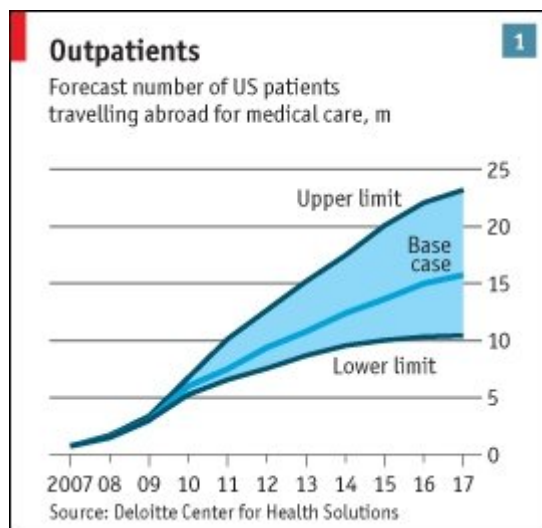
The Futurist · 18 August 2008 · Archived copy · Original

On 3/21/08, I wrote an article about the economic and technological implications of medical tourism. True to our long tradition here at The Futurist, this article made predictions months before a major publication arrived at the same expectations. The Economist has an article this week that predicts everything that by original article does, from a rapid increase in Americans going abroad, to the loss in revenue to the US healthcare system triggering overdue reforms. I particularly like the following sentences from the article :

"Jagdish Bhagwati, an economist at Columbia University, thinks that the offshoring of, for instance, customer service and claims-processing could save America alone \$70 billion-75 billion a year."

"By Deloitte's reckoning, medical travel will represent \$162 billion in lost spending on health care in America by 2012. "

"A bit of rivalry from top foreign facilities may introduce transparency and price competition into an inefficient system riddled with oligopolies and perverse incentives. "



If some people thought the outsourcing of technical support and software development was significant, then medical tourism promises to be several times larger by the middle of the next decade. The Economist article provides a chart projecting the number of US patients expected to partake in medical tourism. The number is expected to grow from under 1 million today to over 15 million by 2017. By then, this could carve \$250 Billion/year out of US healthcare spending, and pump \$50 Billion/year into the destination countries, introducing \$200 Billion/year of net deflationary benefit into the US economy. Everyone will know someone who went abroad for a medical procedure, with many customers comparing their experiences in India vs. Thailand vs. Jamaica.

To repeat the sequence of predicted events from the first article, they are :

- 1) Americans with no insurance are forced to make a life or death decision to get their surgeries abroad, where the service meets or exceeds their expectations.
- 2) More insurance companies offer medical tourism with liability guarantees and cash/vacation incentives to American patients. Only a small fraction of patients are adventurous enough to do this, but all insurance companies are compelled to offer these options.
- 3) Major centers for medical tourism, after a track record of about a decade, develop solid brands that can attract American patients.

4) When we finally get to the point that 10% of Americans are traveling abroad for a wide array of procedures, the US will be forced to begin to take measures to reduce costs throughout the healthcare system. Losing 10% of the market is all that it will take to force some positive changes. This could begin to happen by 2020.

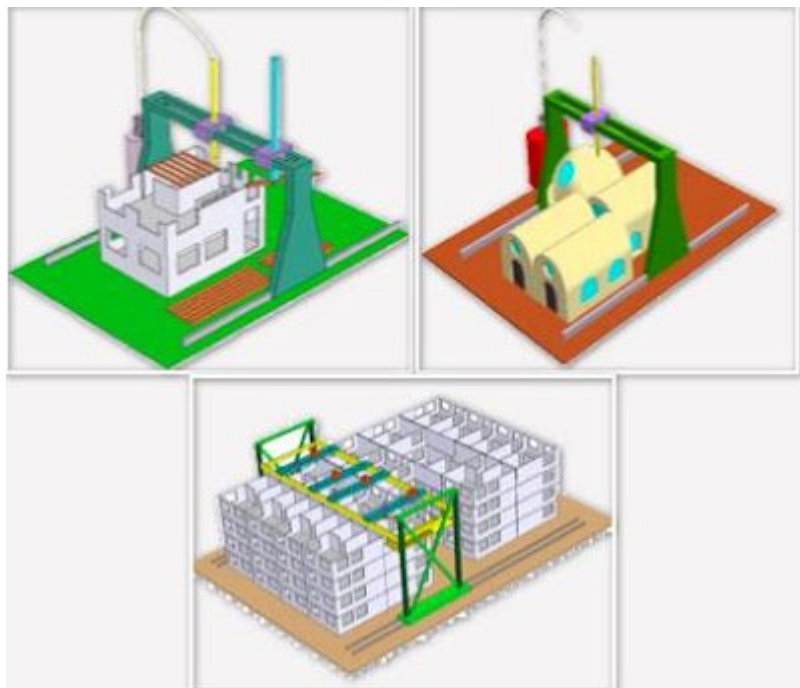
This confluence of market forces, globalization, and biotechnology is about to bring overdue reform to one of the biggest and worst sectors of the US and global economies. There are tremendous investment opportunities here, which I will write about in the near future.

Can Buildings be 'Printed'?

The Futurist · 2 September 2008 · Archived copy · Original

I have discussed the possibility of 3-D printing of solid objects before, [in this article where company #5, Desktop Factory, is detailed](#). However, the Desktop Factory product can only produce objects that have a maximum size of 5 X 5 X 5 inches, and it can only use one type of material.

On the Next Big Future blog, [the author quite frequently profiles a future product capable of 'printing' entire buildings](#). This technology, known as 'Contour Crafting', can supposedly construct buildings at greater than 10 times the speed, yet at just one-fifth the cost of traditional construction processes. It is claimed that the first commercial machines will be available in 2008 itself.



Despite my general optimism, this particular machine does not pass my 'too good to be true' test, at least before 2020. A machine that could construct homes and commercial buildings at such a speed and cost would cause an unprecedented economic disruption across the world. There would be a steep but brief depression, as existing real estate loses 90% or more of its value, followed by a huge boom as home ownership becomes affordable to several times as many people as today. I don't think that we are on the brink of such a revolution.

For me to be convinced, I would have to see :

- 1) Articles on this device in mainstream publications like The Economist, BusinessWeek, MIT Technology Review, or Popular Mechanics.
- 2) The ability to at least print simple constructs like concrete perimeter walls or sidewalks at a rate and cost several times superior to current methods. Only then can more complex structures be on the horizon.

I will revisit this technology if either of these two conditions is solidly met.

([crossposted on TechSector](#)).

Pre-Singularity Abundance Milestones

The Futurist · 11 September 2008 · Archived copy · Original

I am of the belief that we will experience a Technological Singularity around 2050 or shortly thereafter. Many top futurists all arrive at prediction dates between 2045 and 2075. The bulk of Singularity debate revolves not so much around 'if' or even 'when', but rather 'what' the Singularity will appear like, and whether it will be positive or negative for humanity.

To be clear, some singularities have already happened. To non-human creatures, a technological singularity that overhauls their ecosystem already happened over the course of the 20th century. Domestic dogs and cats are immersed in a singularity where most of their surroundings surpass their comprehension. Even many humans have experienced a singularity - elderly people in poorer nations make no use of any of the major technologies of the last 20 years, except possibly the cellular phone. However, the Singularity that I am talking about **has to be one that affects all humans**, and the entire global economy, rather than just humans that are marginal participants in the economy. By definition, the real Technological Singularity has to be a 'disruption in the fabric of humanity'.

In the period between 2008 and 2050, there are several milestones one can watch for in order to see if the path to a possible Singularity is still being followed. Each of these signifies a previously scarce resource becoming almost infinitely abundant (much like paper today, which was a rare and precious treasure centuries ago), or a dramatic expansion in human experience (such as the telephone, airplane, and Internet have been) to the extent that it can even be called a **transhuman experience**. The following are a random selection of milestones with their anticipated dates.

Technological :

Hours spent in videoconferencing surpass hours spent in air travel/airports : 2015

Video games with interactive, human-level AI : 2018

Semi-realistic fully immersive virtual reality : 2020

Over 5 billion people connected to the Internet (mostly wirelessly) at speeds greater than 10 Mbps : 2022

Over 30 network-connected devices in the average household worldwide : 2025

1 TeraFLOPS of computing power costs \$1 : 2026

1 TeraWatt of worldwide photovoltaic power capacity : 2027

1 Petabyte of storage costs \$1 : 2028

1 Terabyte of RAM costs \$1 : 2031

An artificial intelligence can pass the Turing Test : 2040

Biological :

Complete personal genome sequencing costs \$1000 : 2020

Cancer is no longer one of the top 5 causes of death : 2025

Complete personal genome sequencing costs \$10 : 2030

Human life expectancy achieves **Actuarial Escape Velocity** for wealthy individuals : 50% chance by 2040

Economic :

Average US household net worth crosses \$2 million in nominal dollars : 2024

90% of humans living in nations with a **UN Human Development Index** greater than 0.800 (the 2008 definition of a

'developed country', approximately that of the US in 1960) : 2025

10,000 billionaires worldwide (nominal dollars) : 2030

World GDP per Capita crosses \$50,000 in 2008 dollars : 2045

Each of these milestones, while not causing a Singularity by themselves, increase the probability of a true Technological Singularity, with the event horizon pulled in closer to that date. Or, the path taken to each of these milestones may give rise to new questions and metrics altogether. We must watch for each of these events, and update our predictions for the 'when' and 'what' of the Singularity accordingly.

Related : [The Top 10 Transhumanist Technologies](#)

The Futurist's Stock Portfolio for 2009

The Futurist · 15 September 2008 · Archived copy · Original

Today, September 15, 2008, represented just about a perfect day for buying new equity positions. I am going to present my 2009 portfolio, that will be tracked over the next 15.5 months between now and the end of 2009, in relation to the S&P500 index. **My 2008 portfolio is still current, and will be evaluated at the end of 2008**, so the start of this 2009 portfolio will overlap with the end of the 2008 portfolio. To assess my track record, **my 2007 portfolio delivered a superb 13.3% return, relative to just 4.3% for the S&P500 over the same period.**

For 2009, the portfolio is quite simple. I believe that small-cap value and financial stocks are at historically compelling valuations, and have no choice but to rise. A few major technology stocks are also at attractive valuations.

So the portfolio will be :

Security	Symbol	Percentage	Price Paid
iShares Russell 2000 Value	IWN	40%	67.04
Financial Select SPDR	XLF	40%	19.09
Gamestop	GME	5%	38.9
Broadcom	BRCM	5%	21.37
Cisco Systems	CSCO	5%	22.38
Google	GOOG	5%	433.86
		100%	

This captures the following trends from previous articles on The Futurist :

The Next Big Thing in Entertainment, Part I and Part 2

The Impact of Computing

The Stock Market is Exponentially Accelerating too

I hereby sign and seal this portfolio, bought that the closing prices on September 15, 2008, to be evaluated on the last trading day before December 31, 2009.

(crossposted on TechSector)

A Future Timeline for Economics

The Futurist · 28 September 2008 · Archived copy · Original

The **accelerating rate of change** in many fields of technology all manifest themselves in terms of human development, some of which can be accurately tracked within economic data. Contrary to what the media may peddle and despite periodic setbacks, average human prosperity is rising at a rate faster than any other time in human history. **I have described this in great detail in prior articles**, and I continue to be amazed at how little attention is devoted to the important subject of **accelerating economic growth**, even by other futurists.

The time has thus come for making specific predictions about the details of future economic advancement. I hereby present a speculative future timeline of economic events and milestones, which is a sibling article to **Economic Growth is Exponential and Accelerating, v2.0**.

2008-09 : A severe US recession and global slowdown still results in global PPP economic growth staying positive in calendar 2008 and 2009. Negative growth for world GDP, which has not happened since 1973, is not a serious possibility, even though the US and Europe experience GDP contraction in this period. **The world GDP growth rate trendline resides at growth of 4.5% a year.**

2010 : World GDP growth rebounds strongly to 5% a year. More than 3 billion people now live in emerging economies growing at over 6% a year. More than 80 countries, including China, have achieved a Human Development Index of 0.800 or higher, classifying them as developed countries.

2011 : Economic mismanagement in the US leads to a tax increase at the start of 2011, combined with higher interest rates on account of the budget deficit. **This leads to a near-recession or even a full recession in the US**, despite the recovery out of the 2008-09 recession still being young.

2012 : Over 2 billion people have access to unlimited broadband Internet service at speeds greater than 1 mbps, a majority of them receiving it through their wireless phone/handheld device.

2013 : Many single-family homes in the US, particularly in California, are still priced below the levels they reached at the peak in 2006, **as predicted in early 2006 on The Futurist**. If one adjusts for cost of capital over this period, many California homes have corrected their valuations by as much as 50%.

2014 : The positive deflationary economic forces introduced by the **Impact of Computing** are now large and pervasive enough to generate mainstream attention. The semiconductor and storage industries combined exceed \$800 Billion in size, up from \$450 Billion in 2008. The typical US household is now spending \$2500 a year on semiconductors, storage, and other items with rapidly deflating prices per fixed performance. Of course, the items purchased for \$2500 in 2014 can be purchased for \$1600 in 2015, \$1000 in 2016, \$600 in 2017, etc.

2015 : **As predicted in early 2006 on The Futurist**, a 4-door sedan with a 240 hp engine, yet costing only 5 cents/mile to operate (the equivalent of 60 mpg of gasoline), is widely available for \$35,000 (which is within the middle-class price band by 2015). This is the result of combined advances in energy, lighter nanomaterials, and computerized systems.

2016 : **Medical Tourism introduces \$100B/year of net deflationary benefit to healthcare costs in the US economy.** Healthcare inflation is slowed, except for the most advanced technologies for life extension.

2017 : China's per-capita GDP on a PPP basis converges with the world average, resulting in a rise in the Yuan exchange rate. This is neither good nor bad, but very confusing for trade calculations. **A recession ensues while all the adjustments are sorted out.**

2018 : Among new cars sold, gasoline-only vehicles are now a minority. Millions of vehicles are electrically charged through solar panels on a daily basis, relieving those consumers of a fuel expenditure that was as high as \$3000 a year in 2008. Some electrical vehicles cost as little as 1 cent/mile to operate.

2019 : The Dow Jones Industrial Average surpasses 25,000. The Nasdaq exceeds 5000, finally surpassing the record set 19 years prior in early 2000.

2020 : World GDP per capita surpasses \$15,000 in 2008 dollars (up from \$8000 in 2008). Over 100 of the world's nations have achieved a Human Development Index of 0.800 or higher, with the only major concentrations of poverty being in Africa and South Asia. The basic necessities of food, clothing, literacy, electricity, and shelter are available to over 90% of the human race.

Trade between India and the US touches \$400 Billion a year, up from only \$32 Billion in 2006.

2022 : Several million people worldwide are each earning over \$50,000 a year through web-based activities. These activities include blogging, barter trading, video production, web-based retail ventures, and economic activities within virtual worlds. Some of these people are under the age of 16. Headlines will be made when a child known to be perpetually glued to his video game one day surprises his parents by disclosing that he has accumulated a legitimate fortune of more than \$1 million.

2024 : The typical US household is now spending over \$5000 a year on products and services that are affected by the **Impact of Computing**, where value received per dollar spent rises dramatically each year. These include electronic, biotechnology, software, and nanotechnology products. Even cars are sometimes 'upgraded' in a PC-like manner in order to receive better technology, long before they experience mechanical failure. Of course, the products and services purchased for this \$5000 in 2024 can be obtained for \$3200 in 2025, \$2000 in 2026, \$1300 in 2027, etc.

2025 : The printing of solid objects through 3-D printers is inexpensive enough for such printers to be common in upper-middle-class homes. This disrupts the economics of manufacturing, and revamps most manufacturing business models.

2027 : 90% of humans are now living in nations with a **UN Human Development Index** greater than 0.800 (the 2008 definition of a 'developed country', approximately that of the US in 1960). Many Asian nations have achieved per capita income parity with Europe. Only Africa contains a major concentration of poverty.

2030 : The United States still has the largest nominal GDP among the world's nations, in excess of \$50 Trillion in 2030 dollars. China's economy is a close second to the US in size. No other country surpasses even half the size of either of the two twin giants.

The world GDP growth rate trendline has now surpassed 5% a year. As the per capita gap has reduced from what it was in 2000, the US now grows at 4% a year, while China grows at 6% a year.

10,000 billionaires now exist worldwide, causing the term to lose some exclusivity.

2032 : At least 2 TeraWatts of photovoltaic capacity is in operation worldwide, generating 8% of all energy consumed by society. Vast solar farms covering several square miles are in operation in North Africa, the Middle East, India, and Australia. These farms are visible from space.

2034 : The typical US household is now spending over \$10,000 a year on products and services that are affected by the **Impact of Computing**. These include electronic, biotech, software, and nanotechnology products. Of course, the products and services purchased for this \$10,000 in 2034 can be obtained for \$6400 in 2035, \$4000 in 2036, \$2500 in 2037, etc.

2040 : Rapidly accelerating GDP growth is creating astonishing abundance that was unimaginable at the start of the 21st century. Inequality continues to be high, but this is balanced by the fact that many individual fortunes are created in extremely short times. The basic tools to produce wealth are available to at least 80% of all humans.

Greatly increased lifespans are distorting economics, mostly for the better, as active careers last well past the age of 80.

Tourism into space is affordable for upper middle class people, and is widely undertaken.

I believe that this timeline represents a median forecast for economic growth from many major sources, and will be perceived as too optimistic or too pessimistic by an equal number of readers. Let's see how closely reality tracks this timeline.

A History of Stock Market Bottoms

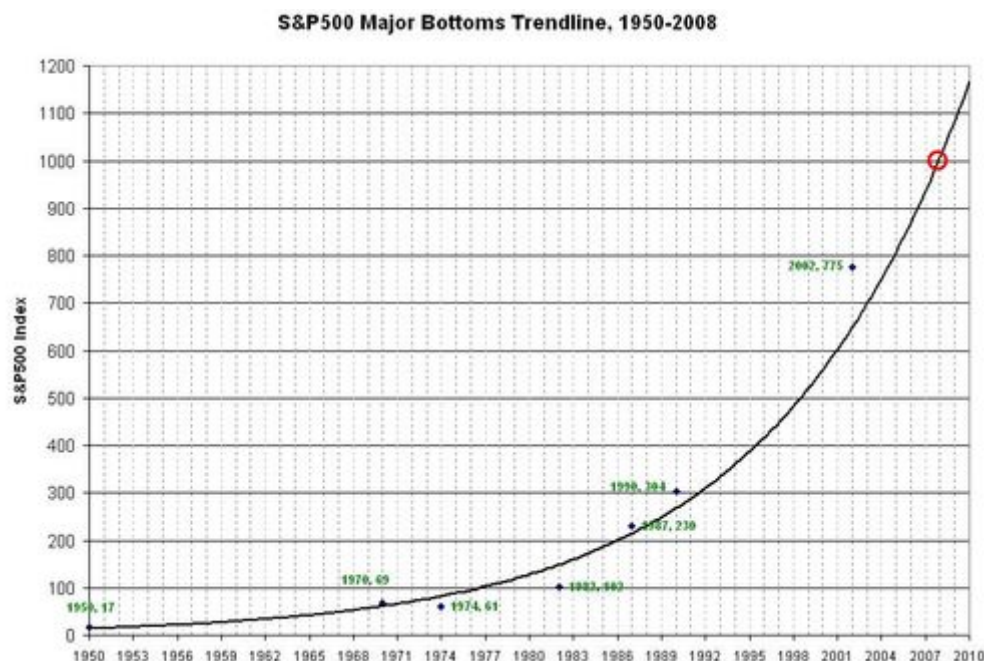
The Futurist · 12 October 2008 · Archived copy · Original

Recent market turmoil has many wondering when the freefall will cease, and whether we are on the brink of a new Great Depression, which is supposed to happen every 70-80 years according to Kondratieff Wave theory. I don't believe we are on the brink of a depression, **even though the present recession is already in its 10th month**. But it would be instructive to compare the current situation with prior market corrections, and judge the present situation in a historical context.

We can first start with a chart of the S&P500, from 1950 to today. We can see that the deepest deviations from the trendline appear to be in 1950, 1970, 1974, 1982, 1987, 1990, and 2002. We shall term these instances as historical 'bottoms' for the stock market. All but the 1987 bottom were in the midst of economic recessions.



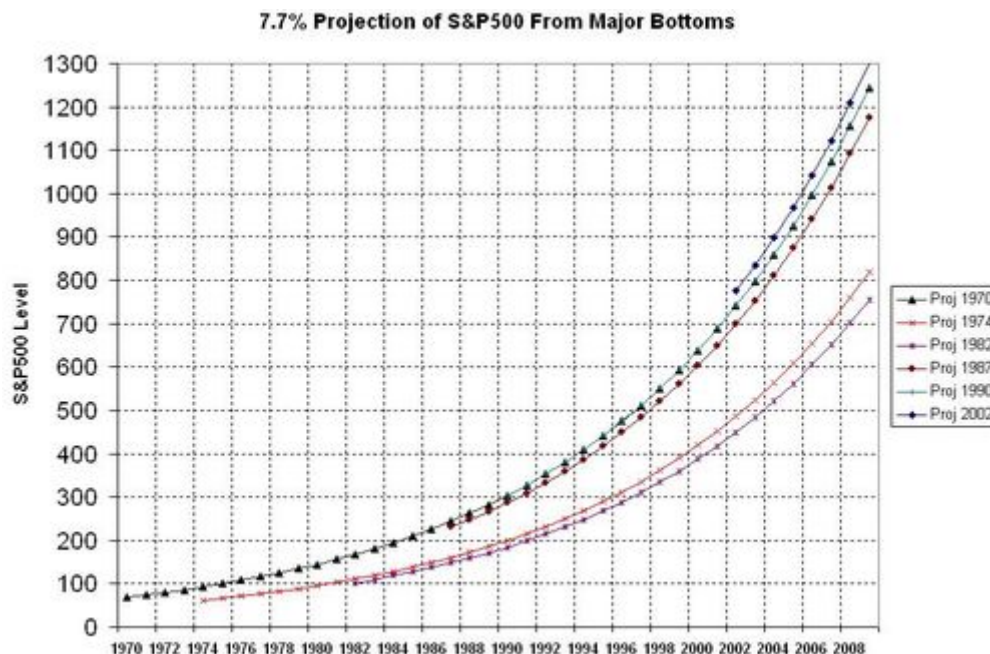
From this chart, we can see that the time period between bottoms can be irregular, with over a decade passing between them, in some cases. 1974 and 1982 appear to be the deepest corrections. These bottoms coincide with recessions, but interestingly do not coincide with other major crises. The Cuban Missile Crisis, Kennedy assassination, and 9/11/01 did not induce major market crashes beyond the first few days. Now, we can take the datapoints of each of these bottoms, and chart the exponential trendline that connects them. This is purely a chart of index valuation, with dividends not included.



From this chart, we can see that the equivalent value of the S&P500 in 2008, as designated by the red circle, would

be around the 1000 level. As of October 10, 2008, the S&P500 is at 899, or 10% below the level of the bottoms trendline. However, we can see that both the 1974 and 1982 bottoms are substantially below the trendline.

The S&P500, since 1950, has delivered an 11.4% average return, with 7.7% of that in the form of a rise in the index itself, and 3.7% of the return being in the form of dividends. If the long-term underlying growth rate of the index is 7.7%, we can chart a 7.7% compounded projection trend from each of these bottoms as another method to compare them to an approximate 2008 equivalent. We shall start this chart from 1970.



It is apparent that 4 of the 6 bottoms cluster around a 2009 projection of 1100-1200, but the two deepest bottoms of 1974 and 1982 project to a 2009 equivalent of only 700-750. These should be considered the two 'mega-bottoms' that happen a couple times per half-century, with the other 4 being only smaller bottoms that happen every 7-10 years, whenever there is a recession.

Since we are presently at 900 for the S&P500, we are about half-way between a smaller bottom and a mega-bottom. Therefore, do not be surprised if the S&P500 does, in fact, dip into the low 700s in 2009, merely to match this correction to 1974/1982 levels. This would be a further 20% correction from the 900 close of October 10, 2008. It may not happen, but it certainly could in terms of historical precedent. This also means that the Dow Jones Industrial Average would simultaneously decline to as low as 6500. Indeed, there is no guarantee that it could not go even lower, but that would be historically unprecedented. Even the 1932 bottom in the Great Depression was not deeper than the 1974 and 1982 bottoms, by these measures.

The Good News :

If the thought of a further 20% decline in the S&P500 or DJIA is depressing, also consider the following :

- 1) After both the 1974 and 1982 mega-bottoms, the stock market promptly returned at least 60% in the next 9 months. This also happened after the 1932 bottom within the Great Depression.
- 2) Never forget about dividend reinvestment. Dividend yields are highest when the stock market is at the depths of a bottom, and reinvestment ensures that new shares are purchased at the lower prices. This enables the investor to enhance his returns when the recovery finally commences. Even in the 1970s, the major indices were stuck within a flat range for a decade, but dividend yields as high as 5% enabled total returns that were substantially better.

Considering points 1) and 2), make sure that you are in a position to capture the recovery, and are not forced to sell at the unfavorable prices of the bottom. This means that you must a) never hold any substantial margin debt, b) be positioned across a diversified set of securities, preferably ETFs ahead of individual stocks, and c) watch as little

financial news as possible, thereby reducing your chances of panic that could lead you to take ill-considered actions.

Tremendous profits will be made by those who can steel themselves through this purging of the weak, and are subsequently prepared for the post-bottom recovery. Put daily volatility aside, and enjoy the historical times that we are experiencing first-hand.

Related :

[Economic Growth is Exponential and Accelerating](#)

[The Housing Bubble - 20-year Gains May Never be Repeated](#)

(crossposted on TechSector)

A Few Electoral Statistics

The Futurist · 9 November 2008 · Archived copy · Original

Congratulations are in order to Barack Obama for becoming the 44th President of the United States. When he first emerged at the 2004 Democratic Convention, no one thought he could topple Hillary Clinton, and go on to win the general election, just 4 years later.

And while I did not vote for him, his success proves once again that America is truly the land of opportunity, far more so than any other nation on Earth.

Now, there are a few electoral statistics that reveal where the Democrats made the biggest gains relative to their losing effort 2004 (all data from CNN.com).

First, in income :

2008			2004		
Vote by Income			VOTE BY INCOME		
Total	 Obama	 McCain	 BUSH	 KERRY	
			TOTAL	2004	2004
Under \$15,000 (6%)	73%	25%	Under \$15,000 (8%)	36%	63%
\$15-30,000 (12%)	60%	37%	\$15-30,000 (15%)	42%	57%
\$30-50,000 (19%)	55%	43%	\$30-50,000 (22%)	49%	50%
\$50-75,000 (21%)	48%	49%	\$50-75,000 (23%)	56%	43%
\$75-100,000 (15%)	51%	48%	\$75-100,000 (14%)	55%	45%
\$100-150,000 (14%)	48%	51%	\$100-150,000 (11%)	57%	42%
\$150-200,000 (6%)	48%	50%	\$150-200,000 (4%)	58%	42%
\$200,000 or More (6%)	52%	46%	\$200,000 or More (3%)	63%	35%

What is remarkable is the the highest income bracket, earning \$200,000 or more, has swung 17 points towards the Democrats. Given that Obama wants to tax this group, this swing is surprising. By contrast, those earning between \$100,000 and \$200,000 have swung just 7 points towards Democrats.

Now, onto race :

2008			2004		
Vote by Race			VOTE BY RACE		
Total	 Obama	 McCain	TOTAL	 BUSH	 KERRY
White (74%)	43%	55%	White (77%)	58%	41%
African-American (13%)	95%	4%	African-American (11%)	11%	88%
Latino (9%)	67%	31%	Latino (8%)	44%	53%
Asian (2%)	62%	35%	Asian (2%)	44%	56%
Other (3%)	66%	31%	Other (2%)	40%	54%

Black turnout rose enough for them to become 13% of the vote, vs. just 11% before. The 7-point swing in favor of Obama relative to what Kerry got is unsurprising. But where the GOP took the biggest damage is in the Latino vote. A 13-point loss is huge, and resulted in states like Nevada, New Mexico, and Colorado shifting from the red column in 2004 to the blue column in 2008.

Lastly, we move onto ideology :

2008			2004		
Vote by Ideology			VOTE BY IDEOLOGY		
Total	 Obama	 McCain	TOTAL	 BUSH	 KERRY
Liberal (22%)	89%	10%	Liberal (21%)	13%	85%
Moderate (44%)	60%	39%	Moderate (45%)	45%	54%
Conservative (34%)	20%	78%	Conservative (34%)	84%	15%

The GOP lost 6 points of the *conservative* vote. That is appalling, and if McCain was able to maintain the same 84% of conservative votes that Bush captured in 2004, the whole 2008 election would have been much closer. This also shows that Sarah Palin, as much as we may like her, did not enable McCain to net Bush's 2004 share of the conservative vote. Some may contend that Palin is the reason McCain got even 78% of the conservative vote, but this is impossible to prove or disprove.

Conclusion :

For the Republican Party to return from the wilderness in a future election (whether 2012 or 2016), they must achieve at least three of the following four objectives.

- 1) Win at least 55% of the votes of those earning over \$100,000 a year, including at least 60% of those earning over \$200,000 a year.
- 2) Win at least 15% of the black vote. Blacks are the most loyal Democratic vote bank, but this also means _____

Democrats are so dependent on the black vote that they cannot afford to let the GOP have even 15% of it.

3) Win at least 45% of the Latino vote. This group is growing quickly, and without it, the GOP has no future.

4) Always win at least 85% of conservatives. A party that cannot win 85% of its own base is in trouble. Now that Obama has won 20% of the conservative vote, **he has to do their bidding as well, which is a topic I have discussed here, and is bad news for leftists.**

So, of these four, pick any three. These four points do overlap with each other, particularly points 1 and 4, so courting multiple groups can be done simultaneously. But until at least three of these four are accomplished, the GOP will not win again.

It's Official : The Recession Began in December 2007

The Futurist · 1 December 2008 · Archived copy · Original

The Nation Bureau of Economic Research (NBER) said that the US has been in recession since December 2007. Of course, that is precisely the time I had given here on The Futurist, except that my declaration was back in February 2008. So I arrived at the same timing estimation, just 10 months before the Federal Government, back when knowing this would actually have been useful.

The longest post-war recession in the US lasted 16 months, so if this recession lasts beyond April of 2009 (which it very well may), it would be the longest post-war recession the US has had. Of course, this recession was shallow for the first 10 months, and only turned sharply lower in October of 2008, so 'duration' is not the whole story.

At present, the consensus is that all of 2009 will effectively be recessionary, putting the recession at 24 months in total duration. Whether this occurs or that pessimism itself is over-shooting remains to be seen.

2008 Technology Breakthrough Roundup

The Futurist · 3 January 2009 · Archived copy · Original

Each year, I post a roundup of technology breakthroughs for that year from the MIT Technology Review, and I now present the 2008 edition.

2008 was a year of unusually low technological innovation. This is not merely the byproduct of the economic recession, as some forms of innovation actually quicken during a recession. Furthermore, the innovations from 2006 and 2007 (linked below) showed very little additional progress in 2008, except in the field of energy. This also confirms my observation from February 2008 that **technology diffusion appears to be in a lull**.

The innovations in 2008 are categorized below :

[The Year in Computing](#)

[The Year in Robotics](#)

[The Year in Biomedicine](#)

[The Year in Materials](#)

What is conspicuously absent is any article titled 'The Year in Nanotechnology'. Both 2006 and 2007 had such articles, but the absence of a 2008 version speaks volumes about how little innovation took place in 2008. The entire field on nanotechnology was lukewarm.

Most of the innovations in the articles above are in the laboratory phase, which means that about half will never progress enough to make it to market, and those that do will take 5 to 15 years to directly affect the lives of average people (remember that the laboratory-to-market transition period itself continues to shorten in most fields).

Furthermore, [The Wall Street Journal has its own innovation awards for 2008](#), but this merely confirms that 2008 was a poor year for innovation. For example, the Tata Nano is chosen in the WSJ article, yet it is not available to consumers until mid-2009. Let's hope 2009 has more genuine innovations.

Into the future we continue, where 2009 awaits....

Related :

[2007 Technology Breakthrough Roundup](#)

[2006 Technology Breakthrough Roundup](#)

The Futurist's Stock Portfolio for 2008 - RESULTS

The Futurist · 6 January 2009 · Archived copy · Original

On November 11, 2007, I created an investment portfolio to be frozen at that time, and evaluated on December 31, 2008, against the S&P500 over the same period. The portfolio incorporated principles, economic trends, and technologies discussed in other articles here on The Futurist. Dividends were reinvested, and so the price paid reflects dividend-adjusted cost-basis. Yahoo and Google Finance do tend to miss recording some dividends, so one must go to a more reliable site like Morningstar to account for the exact dividends.

So how did the portfolio do? Well, the portfolio declined by **37.1%** while the S&P500 declined by **36.0%**. So we lagged the benchmark by 1.1%. Of course, this was a year when keeping money in cash would have been superior to almost any long equity portfolio.

Security	Symbol	Percentage	Price Paid	Current	% Change	Points
iShares Russell 2000 Value	IWN	50%	70.35	49.17	-30.1%	34.95%
iShares EAFE Value	EFV	20%	70.45	40.55	-42.4%	11.51%
Morgan Stanley India Investment Fund	IIF	15%	26.36	12.5	-52.6%	7.11%
Cisco Systems	CSCO	5%	28.58	16.3	-43.0%	2.85%
Activision	ATVI	5%	10.35	8.63	-16.6%	4.17%
Google	GOOG	5%	663.87	308	-53.6%	2.32%
		100%			Total Return	-37.1%
S&P500 Index						-36.0%

As always, weightage matters just as much as selection, and the largest component, IWN, outperformed the S&P500. However, this was dragged down by IIF and GOOG. **Had I simply followed my advice on shorting energy stocks, I would have done better**, but that was not a trade in this portfolio.

At least the 2007 Futurist portfolio outperformed the S&P500 by a greater margin than the 2008 portfolio lagged by, so we are still ahead on aggregate. Let us see what 2009 holds.

	The Futurist	S&P500
2007	13.3%	4.3%
2008	-37.1%	-36.0%

Related :

[A History of Stock Market Bottoms](#)

Why Government is Set to Constrict Silicon Valley

The Futurist · 25 January 2009 · Archived copy · Original

Throughout history, poverty is the normal condition of man. Advances which permit this norm to be exceeded — here and there, now and then — are the work of an extremely small minority, frequently despised, often condemned, and almost always opposed by all right-thinking people. Whenever this tiny minority is kept from creating, or (as sometimes happens) is driven out of a society, the people then slip back into abject poverty.

- Robert Heinlein

The secret sauce of Silicon Valley is the tradition of leaving established companies to start or join new ones, secure funding from venture capitalists, build the company to a suitable size, and then either float or sell the company for a windfall to the founders and early employees. The incentive to continue this practice is the engine that keeps the fire of human technological innovation alive.

Silicon Valley's unique ecosystem has so far been nearly impossible to eclipse. The combination of research universities, the best and brightest immigrants from India and China, a culture of entrepreneurship, and a nearly perfect climate has kept the competitors to Silicon Valley at bay. In the 1990s, the prevalent belief was that the high cost of living in Silicon Valley would enable Austin, Dallas, Seattle, and Phoenix to attract technology workers and cultivate their own tech sectors. This did not happen, as the Silicon Valley ecosystem just had too strong of a gravitational pull.

This, however, should not be an excuse for complacency, or a belief that Silicon Valley is a bottomless supply of tax revenue. There are four steps that would make Silicon Valley prohibitively inhospitable to the formation of new ventures. Any one of these by itself would not be enough to dent the might of the Silicon Valley engine, but all four combined would exceed the breaking point. The first two of these four steps have already happened, and the final two are set to happen, barring direct intervention.

The four steps are :

1) Sarbanes-Oxley : This attempt to reduce the risk of another Enron-style fraud has inflicted a cost on the US economy greater than 100 Enron collapses. In Silicon Valley, the crushing costs of Sarbanes-Oxley compliance (up to \$3M a year) have dried up IPOs to a trickle, as the prospect of spending money of compliance that could otherwise be spent on R&D is unappealing. IPOs are less frequent than they were even in the early 1990s, before the bubble, and start-ups can only hope to be acquired by a larger company. In the last 8 years, only two IPOs were large enough to be considered 'blockbuster' : Google and VMWare. This crushes the incentive to leave stable jobs to go work at a new venture.

2) Tortuous Immigration Process : Any list of the most successful people in the history of Silicon Valley will quickly reveal that at least one third of them were born outside of the US. In response, America has chosen to make it much harder for more such people to come here, even as the quality of life in their home countries is rising.

While politicians pander to *illegal* immigrants with minimal education, they somehow refuse to make immigration easier for *legal*, highly-skilled immigrants who start new ventures in America. This is significant given the fact that about half of Silicon Valley's skilled workforce is Indian or Chinese. Many are choosing to return to their home countries in exasperation, and are advising their younger relatives that the US immigration process is so tedious that it is better to pursue their careers at home, working for Indian or Chinese branches of HP or Microsoft.

Under current procedures, an engineer from India or China has to be on an H1-B visa for 6 years before he can get a greencard. If he changes employers during that period, he has to start the clock again. The immigrant's spouse

cannot work during this period. Even after the greencard, it takes 5 more years to become a US citizen. Unsurprisingly, the best and brightest are deciding that this 11-year limbo is not worth it, and return to their home countries (eventually starting companies there rather than in Silicon Valley). In the 1990s, Americans had not even heard of Bangalore or Suzhou.

[I have written up a detailed solution to this problem over here.](#)

If these two factors weren't bad enough, two more negatives are about to be piled on.

3) California State Income Taxes are Set to Rise : The budget shortfalls and underfunded pensions in California are a ticking time bomb. CalPERS, which invests in many of the top venture capital funds that nurture the growth of start-ups in Silicon Valley, is in a shambolic state, and has to add \$80 billion in assets just to meet present obligations. The top income bracket in California is already taxed at 9.3%, and this is set to rise. Sales taxes are also set to rise. Due to this horrendous mismanagement worthy of a banana republic, California will soon reach a tipping point where taxes are so high as to destroy California's private sector, which until now has been the envy of the world. It would, of course, be better to reduce CA state expenditures, but government officials have made it clear that raising taxes is their preferred course of action.

[Victor Davis Hanson explains California's black hole in more detail.](#)

4) Federal Income Taxes are Set to Rise : If the Bush tax cuts are allowed to expire, then from 2011 onwards, the top income bracket will be taxed at 39.6% rather than the current 35%. Here, too, the concept of reducing expenditures is not palatable to Washington decision-makers. While this does affect the entire US equally, when this is combined with the increase in California State tax, the combined marginal tax rate in California rises several percentage points, and possibly rises well above 50%.

The danger here is that each of these factors by themselves are not life-threatening. But all four of them in cumulative combination are deadly. So on top of the difficulty of conducting an IPO, and the brain drain out of Silicon Valley back to Asia, if the financial windfall that a worker receives after his startup makes a successful exit is taxed at a grand total of 50-55%, fewer and fewer people will aspire to toil away for years in a startup. As a result, fewer startups will form in Silicon Valley, and instead will form in Bangalore, Shanghai, and Taipei.

Furthermore, after these forces have been in effect for a few years a simple reversal of the higher tax rates, dysfunctional immigration policy, and Sarbanes Oxley will not simply restore Silicon Valley to its prior grandeur. The technology centers in Asia will have achieved critical mass by then, and Silicon Valley will have permanently lost its exclusivity. It would never recover the dominance it once had.

Silicon Valley will be reduced to a location that still hosts the headquarters of HP, Intel, Cisco, and Google, but 90% of the employees of these corporations will be overseas, and startups will be rare. Silicon Valley will effectively become like Cleveland or Pittsburgh, which even today host the headquarters of more than 20 Fortune 500 corporations each, but still have a lower population than they each had in 1960, and cannot attract new young people to come and live there. Cleveland and Pittsburgh are still functioning societies, of course, but their economic vibrancy is irretrievably dead.

This bleak outlook can certainly be reversed if prompt action is taken now. Sadly, the current path is one that is set to have a smothering effect on Silicon Valley.

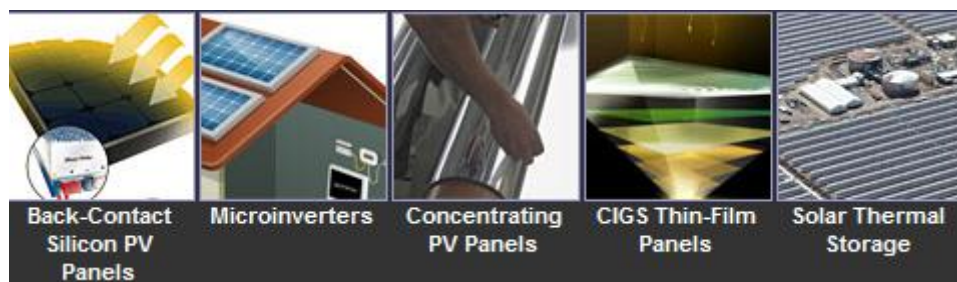
[\(crossposted on Techsector\)](#)

Solar Power's Next 5 Game-Changing Technologies

The Futurist · 3 February 2009 · Archived copy · Original

I have written before about the reduction in price of solar energy, and how each successive price decline would deliver a new generation of adoption. Now, we can examine some of the specific technologies that are driving the race to affordability, and will enable solar energy to be one of the only candidate technologies to lead an economic recovery from the present downturn.

Popular Mechanics has a roundup of five new areas of innovation in harnessing energy from the Sun. All five promise to make solar energy competitive with the cheapest sources of fossil-fuel energy, and many of these five technologies could work in combination with each other. The five technologies are the following :



Now, many of these technologies were invented before 2008, so this roundup does not alter the fact that 2008 was a year of very low technological innovation. However, all these innovations bode very well for a tremendous boom in solar power starting around 2010. Each technology has one or more startup companies mentioned in each section. The industry consensus is that solar power becomes competitive with conventional sources of power generation by around 2011, varying by the local cost of electricity and the solar intensity of a particular region (i.e Arizona becomes cost-competitive for solar before British Columbia does).

The greatest benefits, however, will accrue to emerging markets. Many poorer countries not only have electricity rates that are much more expensive than in the US, but these countries, being in more southern latitudes, receive greater solar intensity to begin with. Breakeven in these markets arrives even sooner than it does for the wealthy countries at more northern latitudes. Many villages in India, VietNam, Iraq, Egypt, and Indonesia will go from having *no* electricity to having photovoltaic electricity.

Related :

[Solar Energy Cost Curve](#)

[The Solar Revolution is Near](#)

[A Future Timeline for Energy](#)

(crossposted on TechSector)

The End of Rabbit Ears, a Billion more Broadband Users - Part II

The Futurist · 16 February 2009 · Archived copy · Original

Three years ago, I wrote about the end of broadcasted television signals through the air on February 17, 2009. It was one of the earliest articles here on The Futurist, and we have now arrived at the date when this transition will take place.

In the last 3 years, we have seen the Apple iPhone (now in a 2.0 version), as well as broad deployment of 3G service to cellular phones. Neither were available in February 2006. But these are small increments compared to what access to the previously unavailable 700 MHz spectrum will give rise to. The auction for the spectrum fetched \$19.6 Billion, indicating how valuable this real-estate is.

Signals sent at this frequency can easily pass through walls, and over far greater distances than signals in higher frequency bands. More importantly, since wireless is the dominant (and often only) means of Internet access in many developing countries, the innovations designed to exploit the 700 MHz band in the US will inevitably be modified to supercharge wireless Internet access in India, Latin America, and Africa. An additional 1 billion broadband Internet users in developing regions will be connected by 2013, as predicted in Part I of this article. There are few technologies that can help pull people out of poverty so quickly.

In the depths of a recession, the events that spark the next expansion arise almost unnoticed. Within 24 months of this event, there will be a vast array of exciting wireless products and services for all of us to enjoy. Remember that today, despite the economy being in its darkest hour, was the day that it began.

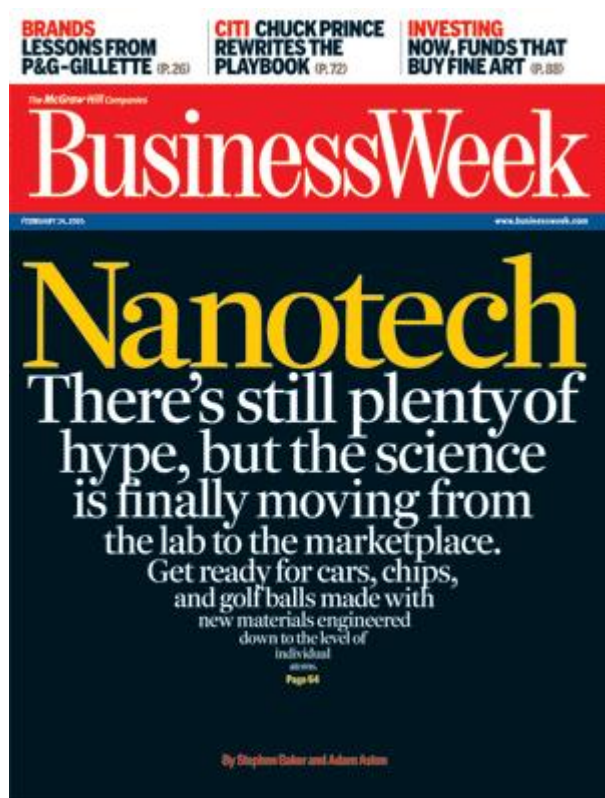
(crossposted on TechSector)

Nanotechnology : Bubble, Bust, ...Boom?

The Futurist · 23 March 2009 · Archived copy · Original

All of us remember the dot-com bubble, the crippling bust that eventually was a correction of 80% from the peak, and the subsequent moderated recovery. This was easy to notice as there were many publicly traded companies that could be tracked daily.

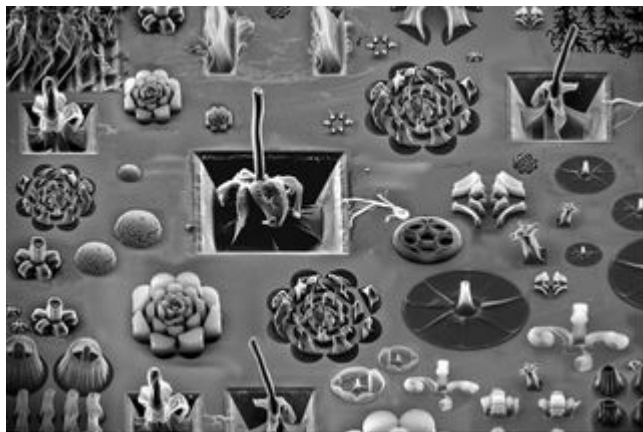
I believe that nanotechnology underwent a similar bubble, peaking in early 2005, and has been in a bust for the subsequent four years. Allow me to elaborate.



By 2004, major publications were talking about nanotech as if it was about to surge. **Lux Capital was publishing a much-anticipated annual 'Nanotech Report'**. There was even a company by the name of NanoSys that was preparing for an IPO in 2004. BusinessWeek even had an entire issue devoted to all things nanotech in February 2005. We were supposed to get excited.

But immediately after the BusinessWeek cover, everything seemed to go downhill. Nanosys did not conduct an IPO, nor did any other company. Lux Capital only published a much shorter report by 2006, and stopped altogether in 2007 and 2008. No other major publication devoted an entire issue to the topic of nanotechnology. Venture capital flowing to nanotech ventures dried up. Most importantly, people stopped talking about nanotechnology altogether. Not many people noticed this because they were too giddy about their home prices rising, but to me, this shriveling of nano-activity had uncanny parallels to prior technology slumps.

The rock bottom was reached at the very end of 2008. **Regular readers will recall that on January 3, 2009, I noticed that MIT Technology Review conspicuously omitted a section titled 'The Year in Nanotech' among their year-end roundup of innovations for the outgoing year.** I could not help but wonder why they stopped producing a nanotech roundup altogether, and I subsequently concluded that we were in a multi-year nanotech winter, and that the MIT Technology Review omission marked the lowest point.



But there are signs that nanotech is on the brink of emerging from its chrysalis. The university laboratories are humming again, promising to draw the genie out of its magic lamp. In just the first 12 weeks of 2009, carbon nanotubes, after staying out of the news for years, have suddenly been making headlines. Entire 'forests' of nanotubes are now being grown (image from MIT Tech Review) and can be used for a variety of previously unrelated applications. Beyond this, there is suddenly activity in [nanotube electronics](#), [light-sensitive nanotubes](#), [nanotube superbatteries](#), and even [nanotube muscles that are as light as air, flexible as rubber, but stronger than steel](#). And all this is just nanotubes. [Nanomedicine](#), [nanoparticle glue](#), and [nanosensors](#) are also joining the party. All this bodes well for the prospect of catching up to [where we currently should be on the trendline of molecular engineering](#), and enabling us to build what was previously impossible.

The recovery out of the four-year nanotech winter could not be happening at a better time. Nanotech is thus set to be one of the four sectors of technology (the others being [solar energy](#), [surface computing](#), and [wireless data](#)) that pull the global economy into its next expansion starting in late 2009.

Related :

[Milli, Micro, Nano, Pico](#)

The Form of Economic Recovery

The Futurist · 17 April 2009 · Archived copy · Original

It is time for me to put forth a prediction on the shape and form of when and where the present recession will end. Recall that The Futurist correctly predicted when the recession will be deemed to have started, about 10 months before the NBER arrived at the same conclusion. Also recall that The Futurist identified the housing bubble back in April of 2006, when suggesting such a thing could get you persecuted by fanatical home-owners.

I hereby predict that :

- 1) The National Bureau of Economic Research (NBER) will declare the recession to have ended in the window of July-Sept, 2009. However, they only declare this retroactively, several months after the fact. The recession will thus have lasted 20-22 months in total.
- 2) Employment will bottom at 130 Million jobs, which means that there are still another 3 million jobs to be lost (on top of the 5 million already lost in this recession). This the steepest fall in employment of any recession in the last 50 years, even after adjusting for the size of the workforce.
- 3) The Unemployment Rate will top out at 10.5% +/- 0.3% early in 2010.
- 4) Neither deflation nor hyperinflation will happen to any significant degree. No calendar year will have an inflation rate below -2% or above 5%.

A conclusion of the recession, however, does not mean the recovery will be strong. It will take many years for the unemployment rate to fall below 5% again. It is, however, absolutely necessary for Americans to reacquaint themselves with the notions of frugality and delayed gratification, and hopefully this recession has taught a suitable lesson to enough profligate gluttons that better decisions are made in the future.

The Impact of Computing : 78% More per Year, v2.0

The Futurist · 20 April 2009 · Archived copy · Original

Anyone who follows technology is familiar with **Moore's Law** and its many variations, and has come to expect the price of computing power to halve every 18 months. But many people don't see the true long-term impact of this beyond the need to upgrade their computer every three or four years. To not internalize this more deeply is to miss financial opportunities, grossly mispredict the future, and be utterly unprepared for massive, sweeping changes to human society. Hence, it is time to update **the first version of this all-important article that was written on February 21, 2006.**

Today, we will introduce another layer to the concept of Moore's Law-type exponential improvement. Consider that on top of the 18-month doubling times of both computational power and storage capacity (an annual improvement rate of 59%), both of these industries have grown by an average of approximately 12% a year for the last fifty years. Individual years have ranged between +30% and -12%, but let us say that the trend growth of both industries is 12% a year for the next couple of decades.

So, we can conclude that a dollar gets 59% more power each year, and 12% more dollars are absorbed by such exponentially growing technology each year. If we combine the two growth rates to estimate the rate of technology diffusion simultaneously with exponential improvement, we get $(1.59)(1.12) = 1.78$

The Impact of Computing grows at a scorching pace of 78% a year.

Sure, this is a very imperfect method of measuring technology diffusion, but many visible examples of this surging wave present themselves. Consider the most popular television shows of the 1970s, where the characters had all the household furnishings and electrical appliances that are common today, except for anything with computational capacity. Yet, economic growth has averaged 3.5% a year since that time, nearly doubling the standard of living in the United States since 1970. It is obvious what has changed during this period, to induce the economic gains.

We can take the concept even closer to the present. Among 1990s sitcoms, how many plot devices would no longer exist in the age of cellphones and Google Maps? Consider the episode of Seinfeld entirely devoted to the characters not being able to find their car, or each other, in a parking structure (1991). **Or this legendary bit from a 1991 episode in a Chinese restaurant.** These situations are simply obsolete in the era of cellphones. **This situation (1996) would be obsolete in the era of digital cameras,** while the 'Breakfast at Tiffany's' situation would be obsolete in an era of Netflix and YouTube.

In the 1970s, there was virtually no household product with a semiconductor component. In the 1980s, many people bought basic game consoles like the Atari 2600, had digital calculators, and purchased their first VCR, but only a fraction of the VCR's internals, maybe 20%, comprised of exponentially deflating semiconductors, so VCR prices did not drop that much per year. In the early 1990s, many people began to have home PCs. For the first time, a major, essential home device was pegged to the curve of 18-month halvings in cost per unit of power. In the late 1990s, the PC was joined by the Internet connection and the DVD player.

Now, I want everyone reading this to tally up all the items in their home that qualify as 'Impact of Computing' devices, which is any hardware device where a much more powerful/capacious version will be available for the same price in 2 years. You will be surprised at how many devices you now own that did not exist in the 80s or even the 90s.

Include : Actively used PCs, LCD/Plasma TVs and monitors, DVD players, game consoles, digital cameras, digital picture frames, home networking devices, laser printers, webcams, TiVos, Slingboxes, Kindles, robotic toys, every mobile phone, every iPod, and every USB flash drive. Count each car as 1 node, even though modern cars may have \$4000 of electronics in them.

Do not include : Tube TVs, VCRs, film cameras, individual video games or DVDs, or your

washer/dryer/oven/clock radio just for having a digital display, as the product is not improving dramatically each year.

How many 'Impact of Computing' Nodes do you currently own?	
☐	Under 10
☐	11-15
☐	16-20
☐	21+
Vote	View
Free polls from Pollhost.com	

If this doesn't persuade people of the exponentially accelerating penetration of information technology, then nothing can.

To summarize, the number of devices in an average home that are on this curve, by decade :

1960s and earlier : 0

1970s : 0-1

1980s : 1-2

1990s : 3-4

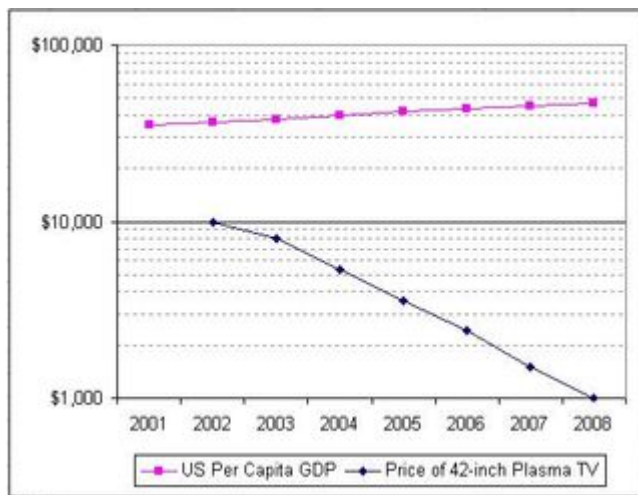
2000s : 6-12

2010s : 15-30

2020s : 40-80

The average home of 2020 will have multiple ultrathin TVs hung like paintings, robots for a variety of simple chores, VR-ready goggles and gloves for advanced gaming experiences, sensors and microchips embedded into clothing, \$100 netbooks more powerful than \$10,000 workstations of today, **surface computers**, 3-D printers, intelligent LED lightbulbs with motion-detecting sensors, **cars with features that even luxury models of today don't have**, and at least 15 nodes on a home network that manages the entertainment, security, and energy infrastructure of the home simultaneously.

At the industrial level, the changes are even greater. Just as telephony, photography, video, and audio before them, we will see medicine, energy, and manufacturing industries become information technology industries, and thus set to advance at the rate of the Impact of Computing. The economic impact of this is staggering. **Refer to the Future Timeline for Economics, particularly the 2014, 2024, and 2034 entries.** Deflation has traditionally been a bad thing, but the Impact of Computing has introduced a second form of deflation. A good one.



It is true that from 2001 to 2009, the US economy has actually shrunk in size, if measured in oil, gold, or Euros. To that, I counter that every major economy in the world, including the US, has grown tremendously if measured in Gigabytes of RAM, TeraBytes of storage, or MIPS of processing power, all of which have fallen in price by about 40X during this period. One merely has to select any suitable product, such as a 42-inch plasma TV in the chart, to see how quickly purchasing power has risen. What took 500 hours of median wages to purchase in 2002 now takes just 40 hours of median wages in 2009. Pessimists counter that computing is too small a part of the economy for this to be a significant prosperity elevator. But let's see how much of the global economy is devoted to computing relative to oil (let alone gold).

Oil at \$50/barrel amounts to about \$1500 Billion per year out of global GDP. When oil rises, demand falls, and we have not seen oil demand sustain itself to the extent of elevating annual consumption to more than \$2000 Billion per year.

Semiconductors are a \$250 Billion industry and storage is a \$200 Billion industry.

Software, photonics, and biotechnology are deflationary in the same way as semiconductors and storage, and these three industries combined are another \$500 Billion in revenue, but their rate of deflation is less clear, so let's take just half of this number (\$250 Billion) as suitable for this calculation.

So $\$250B + \$200B + \$250B = \$700$ Billion that is already deflationary under the Impact of Computing. This is about 1.5% of world GDP, and is a little under half the size of global oil revenues.

The impact is certainly not small, and since the growth rate of these sectors is higher than that of the broader economy, what about when it becomes 3% of world GDP? 5%? Will this force of good deflation not exert influence on every set of economic data? At the moment, it is all but impossible to get major economics bloggers to even acknowledge this growing force. But over time, it will be accepted as a limitless well of rising prosperity.

12% more dollars spent each year, and each dollar buys 59% more power each year. Combine the two and the impact is 78% more every year.

Related :

[A Future Timeline for Economics](#)

[Economic Growth is Exponential and Accelerating](#)

[Are You Acceleration Aware?](#)

[Pre-Singularity Abundance Milestones](#)

[The Technological Progression of Video Games](#)

Energy vs. Financials, RESULTS

The Futurist · 20 May 2009 · Archived copy · Original

On April 22, 2008, I wrote about how the Energy and Financial sectors had diverged from each other, up to that point, to a degree that rarely happens between any two major sectors of the market. I proceeded to suggest a trade of shorting Energy while going long on Financials.

Let us see how that trade turned out, about 1 year after it was suggested.



Both sectors did worse than the S&P500, but as we were short on Energy, this is favorable. With dividends reinvested (which for Financials, were substantial), we come to total returns of :

Index	Security	Return
Energy (short)	XLE	40.35%
Financials	XLF	-51.07%
Total		→ -5.36%
S&P500	SPY	-32.20%

So this trade earned a return of -5.36%, vs. -32.20% for the S&P500. This is a dramatic outperformance relative to the index, even though staying in cash would have been even better.

For a next step, I would cover the short on Energy, and double down on my long position in Financials, given the low current price of Financials.

SETI and the Singularity

The Futurist · 23 May 2009 · Archived copy · Original

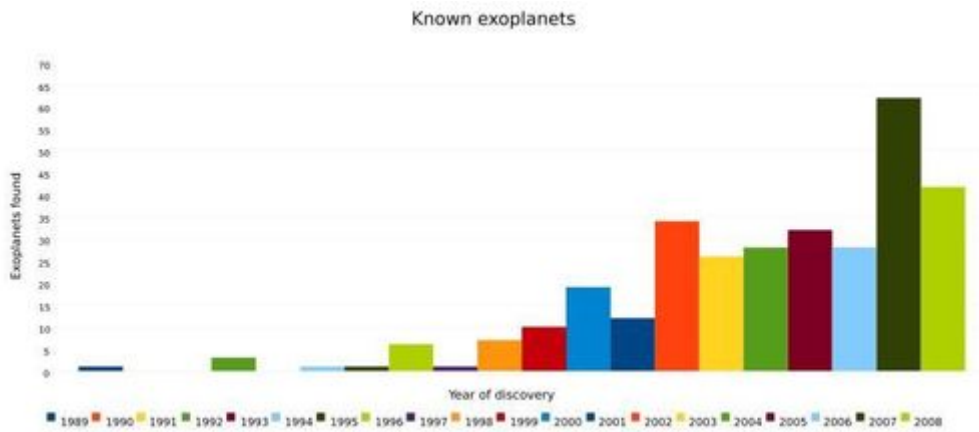


The Search for Extra-Terrestrial Intelligence (SETI) seeks to answer one of the most basic questions of human identity - whether we are alone in the universe, or merely one civilization among many. It is perhaps the biggest question that any human can ponder.

The Drake Equation, created by astronomer Frank Drake in 1960, calculates the number of advanced extra-terrestrial civilizations in the Milky Way galaxy in existence at this time. [Watch this 8-minute clip of Carl Sagan in 1980 walking the audience through the parameters of the Drake Equation.](#) The Drake equation manages to educate people on the deductive steps needed to understand the basic probability of finding another civilization in the galaxy, but as the final result varies so greatly based on even slight adjustments to the parameters, it is hard to make a strong argument for or against the existence of extra-terrestrial intelligence via the Drake equation. The most speculative parameter is the last one, f_L , which is an estimation of the total lifespan of an advanced civilization. Again, this video clip is from 1980, and thus only 42 years after the advent of radio astronomy in 1938. Another 29 years, or 70%, have since been added to the age of our radio-astronomy capabilities, and the prospect of nuclear annihilation of our civilization is far lower today than in was in 1980. No matter how ambitious or conservative of a stance you take on the other parameters, the value of f_L in terms of our own civilization, continues to rise. This leads us to our first postulate :

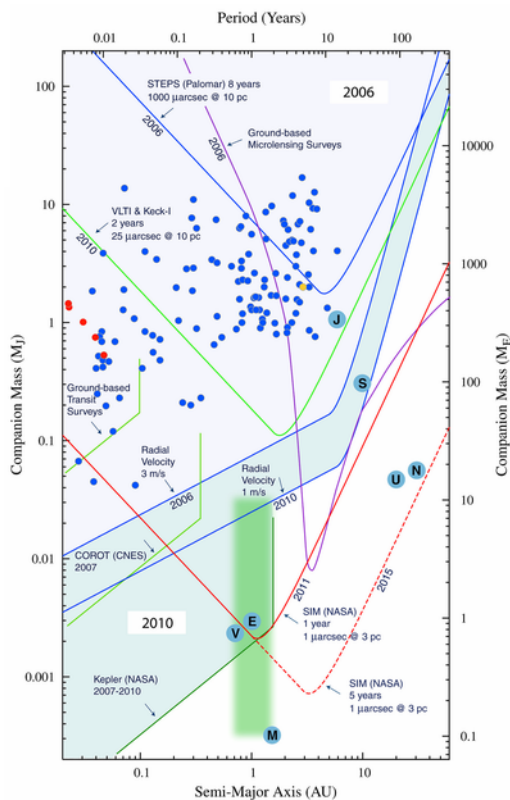
The expected lifespan of an intelligent civilization is rising.

Carl Sagan himself believed that in such a vast cosmos, that intelligent life would have to emerge in multiple locations, and the cosmos was thus 'brimming over' with intelligent life. On the other side are various explanations for why intelligent life will be rare. The [Rare Earth Hypothesis](#) argues that the combination of conditions that enabled life to emerge on Earth are extremely rare. The [Fermi Paradox](#), originating back in 1950, questions the contradiction between the supposed high incidence of intelligent life, and the continued lack of evidence of it. The [Great Filter](#) theory suggests that many intelligent civilizations self-destruct at some point, explaining their apparent scarcity. This leads to the conclusion that the easier it is for civilization to advance to our present stage, the bleaker our prospects for long-term survival, since the 'filter' that other civilizations collide with has yet to face us. A contrarian case can thus be made that the longer we go without detecting another civilization, the better.



But one dimension that is conspicuously absent from all of these theories is an accounting for the accelerating rate of change. **I have previously provided evidence that telescopic power is also an accelerating technology.** After the invention of the telescope by Galileo in 1609, major discoveries used to be several decades apart, but now are only separated by years. An extrapolation of various discoveries **enabled me to crudely estimate that our observational power is currently rising at 26% per year**, even though the first 300 years after the invention of the telescope only saw an improvement of 1% a year. At the time of the 1980 Cosmos television series, it was not remotely possible to confirm the existence of any extrasolar planet or to resolve any star aside from the sun into a disk. Yet, both were accomplished by the mid-1990s. As of May 2009, we have now confirmed a total of 347 extrasolar planets, with the rate of discovery rising quickly. While the first confirmation was not until 1995, we now are discovering new planets at a rate of 1 per week. With a number of new telescope programs being launched, this rate will rise further still. Furthermore, most of the planets we have found so far are large. Soon, we will be able to detect planets much smaller in size, including Earth-sized planets. This leads us to our second postulate :

Telescopic power is rising quickly, possibly at 26% a year.



This Jet Propulsion Laboratory chart of exoplanet discoveries through 2004 is very overdue for an update, but is still instructive. The x-axis is the distance of the planet from the star, and the y-axis is the mass of the planet. All blue, red, and yellow dots are exoplanets, while the larger circles with letters in them are our own local planets, with the 'E' being Earth. Most exoplanet discoveries up to that time were

of Jupiter-sized planets that were closer to their stars than Jupiter is to the sun. The green zone, or 'life zone' is the area within which a planet is a candidate to support life within our current understanding of what life is. Even then, this chart does not capture the full possibilities for life, as a gas giant like Jupiter or Saturn, at the correct distance from a Sun-type star, might have rocky satellites that would thus also be in the life zone. In other words, if Saturn were as close to the Sun as Earth is, Titan would also be in the life zone, and thus the green area should extend vertically higher to capture the possibility of such large satellites of gas giants. The chart shows that telescopes commissioned in the near future will enable the detection of planets in the life zone. If this chart were updated, a few would already be recorded here. Some of the missions and telescopes that will soon be sending over a torrent of new discoveries are :

Kepler Mission : Launched in March 2009, the Kepler Mission will continuously monitor a field of 100,000 stars for the transit of planets in front of them. This method has a far higher chance of detecting Earth-sized planets than prior methods, and we will see many discovered by 2010-11.

COROT : This European mission was launched in December 2006, and uses a similar method as the Kepler Mission, but is not as powerful. COROT has discovered a handful of planets thus far.

New Worlds Mission : This 2013 mission will build a large sunflower-shaped occulter in space to block the light of nearby stars to aid the observation of extrasolar planets. A large number of planets close to their stars will become visible through this method.

Allen Telescope Array : Funded by Microsoft co-founder Paul Allen, the ATA will survey 1,000,000 stars for radio astronomy evidence of intelligent life. The ATA is sensitive enough to discover a large radio telescope such as the Arecibo Observatory up to a distance of 1000 light years. **Many of the ATA components are electronics that decline in price in accordance with Moore's Law**, which will subsequently lead to the development of the.....

Square Kilometer Array : Far larger and more powerful than the Allen Telescope Array, the SKA will be in full operation by 2020, and will be the most sensitive radio telescope ever. The continual decline in the price of processing technology will enable the SKA to scour the sky thousands of times faster than existing radio telescopes.

These are merely the missions that are already under development or even under operation. Several others are in the conceptual phase, and could be launched within the next 15 years. So many methods of observation used at once, combined with the cost improvements of Moore's Law, leads us to our third postulate, which few would have agreed with at the time of 'Cosmos' in 1980 :

Thousands of planets in the 'life zone' will be confirmed by 2025.

Now, we will revisit the under-discussed factor of accelerating change. Out of 4.5 billion years of Earth's existence, it has only hosted a civilization capable of radio astronomy for 71 years. But as our own technology is advancing on a multitude of fronts, through the **accelerating rate of change** and the **Impact of Computing**, each year, the power of our telescopes increases and the signals of intelligence (radio and TV) emitted from Earth move out one more light year. Thus, the probability for us to detect someone, and for us to be detected by them, however small, is now rising quickly. Our civilization gained far more in both detectability, and detection-capability, in the 30 years between 1980 and 2010, relative to the 30 years between 1610 and 1640, when Galileo was persecuted for his discoveries and support of heliocentrism, and certainly relative to the 30 years between 70,000,030 and 70,000,000 BC, when no advanced civilization existed on Earth, and the dominant life form was Tyrannosaurus.

Nikolai Kardashev has devised a scale to measure the level of advancement that a technological civilization has achieved, based on their energy technology. This simple scale can be summarized as follows :

Type I : A civilization capable of harnessing all the energy available on their planet.

Type II : A civilization capable of harnessing all the energy available from their star.

Type III : A civilization capable of harnessing all the energy available in their galaxy.

The scale is logarithmic, and our civilization currently would receive a Kardashev score of 0.72. We could potentially achieve full Type I status by the mid-21st century due to a technological singularity. Some have estimated that our exponential growth could elevate us to Type II status by the late 22nd century.

This has given rise to another faction in the speculative debate on extra-terrestrial intelligence, a view held by Ray Kurzweil, among others. The theory is that it takes such a short time (a few hundred years) for a civilization to go from the earliest mechanical technology to reach a technological singularity where artificial intelligence saturates surrounding matter, relative to the lifetime of the home planet (a few billion years), that we are the first civilization to come this far. Given the rate of advancement, a civilization would have to be just 100 years ahead of us to be so advanced that they would be easy to detect within 100 light years, despite 100 years being such a short fraction of a planet's life. In other words, where a 19th century Earth would be undetectable to us today, an Earth of the 22nd century would be extremely conspicuous to us from 100 light years away, emitting countless signals across a variety of mediums.

A Type I civilization within 100 light years would be readily detected by our instruments today. A Type II civilization within 1000 light years will be visible to the Allen or the Square Kilometer Array. A Type III would be the only type of civilization that we probably could not detect, as we might have already been within one all along. We do not have a way of knowing if the current structure of the Milky Way galaxy is artificially designed by a Type III civilization. Thus, the fourth and final postulate becomes :

A civilization slightly more advanced than us will soon be easy for us to detect.

The Carl Sagan view of plentiful advanced civilizations is the generally accepted wisdom, and a view that I held for a long time. On the other hand, the Kurzweil view is understood by very few, for even in the SETI community, not that many participants are **truly acceleration aware**. The accelerating nature of progress, which existed long before humans even evolved, as **shown in Carl Sagan's cosmic calendar concept, also from the 1980 'Cosmos' series**, simply has to be considered as one of the most critical forces in any estimation of extra-terrestrial life. I have not yet migrated fully to the Kurzweil view, but let us list our four postulates out all at once :

The expected lifespan of an intelligent civilization is rising.

Telescopic power is rising quickly, possibly at 26% a year.

Thousands of planets in the 'life zone' will be confirmed by 2025.

A civilization slightly more advanced than us will soon be easy for us to detect.

As the **Impact of Computing** will ensure that computational power rises 16,000X between 2009 and 2030, and that our radio astronomy experience will be 92 years old by 2030, there are just too many forces that are increasing our probabilities of finding a civilization if one does indeed exist nearby. It is one thing to know of no extrasolar planets, or of any civilizations. It is quite another to know about thousands of planets, yet *still* not detect any civilizations after years of searching. This would greatly strengthen the case against the existence of such civilizations, and the case would grow stronger by year. Thus, these four postulates in combination lead me to conclude that :

If we do not find any evidence of extra-terrestrial intelligence by 2030, then we can confirm with some certainty that such civilizations are not as common as the proponents had hoped. Additionally, each subsequent year without a discovery makes the probability exponentially less likely.

Most of the 'realistic' science fiction regarding first contact with another extra-terrestrial civilization portrays that civilization being domiciled relatively nearby. In Carl Sagan's 'Contact', the civilization was from the Vega star system, just 26 light years away. In the film 'Star Trek : First Contact', humans come in contact with Vulcans in 2063, but the Vulcan homeworld is also just 16 light years from Earth. The possibility of any civilization this near to us would be effectively ruled out by 2030 if we do not find any favorable evidence. SETI should still be given the highest priority, of course, as the lack of a discovery is just as important as making a discovery of extra-terrestrial intelligence.

If we do detect evidence of an extra-terrestrial civilization, everything about life on Earth will change. Both 'Contact' and 'Star Trek : First Contact' depicted how an unprecedented wave of human unity swept across the globe upon evidence that humans were, after all, one intelligent species among many. In Star Trek, this led to what essentially became a techno-economic singularity for the human race. As shown in 'Contact', many of the world's religions were turned upside down upon this discovery, and had to revise their doctrines accordingly. Various new cults devoted to the worship of the new civilization formed almost immediately.

If, however, we are alone, then according to many Singularitarians, we will be the ones to determine the destiny of the cosmos. After a technological singularity in the mid-21st century that merges our biology with our technology, we would proceed to convert all matter into artificial intelligence, make use of all the elementary particles in our vicinity, and expand outward at speeds that eventually exceed the speed of light, ultimately saturating the entire universe with out intelligence in just a few centuries. That, however, is a topic for another day.

The Next Big Thing in Entertainment, A Half-Time Update

The Futurist · 19 July 2009 · Archived copy · Original

On April 1, 2006, I wrote a detailed article on the revolutionary changes that were to occur in the concept of home entertainment by 2012 (see [Part I](#) and [Part II](#) of the article). Now, in 2009, half of the time within the six-year span between the original article and the prediction has elapsed. Of course, given the [exponential nature of progress](#), much more happens within the second half of any prediction horizon relative to the first half.

The prediction issued in 2006 was:

Video Gaming (which will no longer be called this) will become a form of entertainment so widely and deeply partaken in that it will reduce the time spent on watching network television to half of what it is (in 2006), by 2012.

The basis of the prediction was detailed in various points from the original article, which in combination would lead to the outcome of the prediction. The progress as of 2009 around these points is as follows :

1) Video game graphics continue to improve : [Note the progress of graphics at 10-year intervals starting from 1976](#). Projecting the same trend, 2012 will feature many games with graphics that rival that of CGI films, which itself can be charted by comparing Pixar's 'Toy Story' from 1995 to 'Up' from 2009. [See this demonstration from the 2009 game 'Heavy Rain'](#), which arguably exceeds the graphical quality of many CGI films from the 1990s.

The number of polygons per square inch on the screen is a technology that is closely tied to [The Impact of Computing](#), and can only rise steadily. The 'uncanny valley' is a hurdle that designers and animators will take a couple of years to overcome, but overcoming this barrier is inevitable as well.

2) Flat-screen HDTVs reach commodity prices : This has already happened, and prices will continue to drop so that by 2012, 50-inch sets with high resolution will be under \$1000. A thin television is important, as it clears the room to allow more space for the movement of the player. A large size and high resolution are equally important, in order to create an immersive visual experience.

We are rapidly trending towards LED and Organic LED (OLED) technologies that will enable TVs to be less than one centimeter thick, with ultra-high resolution.

3) Speech and motion recognition as control technologies : When the original article was written on April 1, 2006, the Nintendo Wii was not yet available in the market. But as of June 2009, 50 million units of the Wii have sold, and many of these customers did not own any game console prior to the Wii.

The traditional handheld controllers are very limited in this regard, despite being used by hundreds of millions of users for three decades. If the interaction that a user can have with a game is more natural, the game becomes more immersive to the human senses. [See this demonstration from Microsoft for their 'Project Natal' interface technology, due for release in 2010](#).

Furthermore, haptic technologies have made great strides, [as seen in the demonstration videos over here](#). Needless to say, the possibilities are vast.

4) More people are migrating away from television, and towards games : [Television viewership is plummeting](#), particularly among the under-50 audience, as projected in the original 2006 article. Fewer and fewer television programs of any quality are being produced, as creative talent continues to leak out of television network studios. At the same time, World of Warcraft has 11 million subscribers, and as previously mentioned, the Wii has 50 million units in circulation.

There are only so many hours of leisure available in a day, and Internet surfing, movies, and video games are all more compelling than the ever-declining quality of television offerings. Children have already moved away from television, and the trend will creep up the age scale.

5) Some people can earn money through games : There are an increasing number of ways where avid players can earn real money from activities within a Game. From trading of items to selling of characters, this market is estimated at over \$1 billion in 2008, and is growing. Highly skilled players already earn thousands of dollars per year this way, and with more participants joining through more advanced VR experiences described above, this will attract a group of people who are able to earn a full-time living through these VR worlds. This will become a viable form of entrepreneurship, just like eBay and Google Ads support entrepreneurial ecosystems today.

Taking all 5 of these points in combination, the original 2006 prediction appears to be on track. By 2012, hours spent on television will be half of what they were in 2006, with sports and major live events being the only forms of programming that retain their audience.

Overall, the prediction seems to be well on track. Disruptive technologies are in the pipeline, and there is plenty of time for each of these technologies to combine into unprecedented new applications. Let us see what the second half of the time interval, between now and 2012, delivers.

Video Conferencing : A Cascade of Disruptions

The Futurist · 11 August 2009 · Archived copy · Original



Almost 3 years ago, in October of 2006, I first wrote about Cisco's Telepresence technology which had just launched at that time, and how video conferencing that was virtually indistinguishable from reality was eventually going to sharply increase the productivity and living standards of corporate employees (image : Cisco).

At that time, Cisco and Hewlett Packard both launched full-room systems that cost over \$300,000 per room. Since then, there has not been any price drop from either company, which is unheard of for a system with components subject to Moore's Law rates of price declines. This indicates that market demand has been high enough for both Cisco and HP to sustain pricing power and improve margins. Smaller companies like LifeSize, Polycom, and Teleris have lower-end solutions for as little as \$10,000, that have also been selling briskly, but have not yet dragged down the Cisco/HP price tier.

This article in the San Jose Mercury News indicates what sort of savings these two corporations have earned by use of their own systems :

In a trend that could transform the way companies do business, Cisco Systems has slashed its annual travel budget by two-thirds — from \$750 million to \$240 million — by using similar conferencing technology to replace air travel and hotel bills for its vast workforce.

Likewise, Hewlett-Packard says it sliced 30 percent of its travel expenses from 2007 to 2008 — and expects even better results for 2009 — in large part because of its video conference technology.

If Cisco can chop its travel expenses by two-thirds, and save \$500 million per year (which increases their annual profit by a not-insignificant 6-10%), then every other large corporation can save a similar magnitude of money. For corporations with very narrow operating margins, the savings could have a dramatic impact on operating earnings, and therefore stock price. The Fortune 500 alone (excluding airline and hotel companies) could collectively save \$100 billion per year, in a wave set to begin immediately if either Cisco or HP drops the price of their solution, which may happen in a matter of months. We will soon see that for every \$20 that corporations used to spend on air travel and hotels, they will instead be spending only \$1 on videoconferencing expenses. This is gigantic gain in enterprise productivity.

Needless to say, high-margin airline revenue from flights between major business centers (such as San Francisco-Taipei or New York-London) will be slashed, and airlines will have to consolidate to fewer flights, making suitability for business travel even less flexible and losing even more passengers. Hotels will have to consolidate, and taxis and restaurants in business hubs will suffer as well. But these are merely the most obvious of disruptions.

What is even more interesting are the less obvious ripple effects that only manifest a few years later, which are :

1) Employee Time and Hassle : Anyone who has had to travel to another continent for a Mon-Fri workweek trip knows that the process of taking a taxi to the airport, waiting 2 hours at the airport, the flight itself, and the ride to the final destination consumes most of the weekends on either side of the trip. Most senior executives log over 200,000 miles of flight per year. This is a huge drag on personal time and quality of life. Travel on weekdays consume productive time that the employer could benefit from, which for senior executives, could be worth thousands of dollars per hour. Furthermore, in an era of superviruses, we have already seen SARS, bird flu, and swine flu as global pandemic threats within the last few years. A reduction of business travel will slow down the rate at which such viruses can spread across the globe and make quarantines less inconvenient for business (although tourist travel and remaining business travel are still carriers of this).

2) Real Estate Prices in Expensive Areas : Home prices in Manhattan and Silicon Valley are presently 4X or more higher than a home of the same square footage 80 miles away. By 2015, the single-screen solution that Cisco sells for \$80,000 today may cost as little as \$2000, and those from LifeSize and others may be even cheaper, so hosting meetings with colleagues from a home office might be as easy as running a conference call. A good portion of employees who have small children may find it possible to do their jobs in a manner than requires them to go to their corporate office only once or twice a week. If even 20% of employees choose to flee the high-cost housing near their offices, the real estate prices in Manhattan and Silicon Valley will deflate significantly. While this is bad news for owners of real-estate in such areas, it is excellent news for new entrants, who will see an increase in their purchasing power. Best of all, working families may be able to afford to have children that they presently cannot finance.

3) Passenger Aviation Technological Leap : Airlines and aircraft manufacturers have little recourse but to respond to these disruptions with innovations of their own, of which the only compelling possibility is to have each journey take far less time. It is apparent that there has been little improvement in the speed of passenger aircraft in the last 40 years. [J. Storrs Hall at the Foresight Institute has an article up with a chart that shows the improvements and total flattening of the speed of passenger airline travel.](#) The cost of staying below Mach 1 vs. being above it are very different, as much as 3X, which accounts for the sudden halt in speed gains just below the speed of sound after the early 1960s. However, the technologies of supersonic aircraft (which exist, of course, in military planes) are dropping in price, and it is possible that suborbital passenger flight could be available for the cost of a first-class ticket by 2025. The Ansari X-prize contest and Space Ship Two have already demonstrated early incarnations of what could scale up to larger planes. This will not reverse the video-conferencing trend, of course, but it will make the airlines more competitive for those interactions that have to be in person.

So we are about to see a cascade of disruptions pulsate through the global economy. While in 2009, you may have no choice but to take a 14-hour flight (each way) to Asia, in 2025, the similar situation may present you with a choice between handling the meeting with the videoconferencing system in your home office vs. taking a 2-hour suborbital flight to Asia.

This, my friends, is progress.

Timing the Singularity

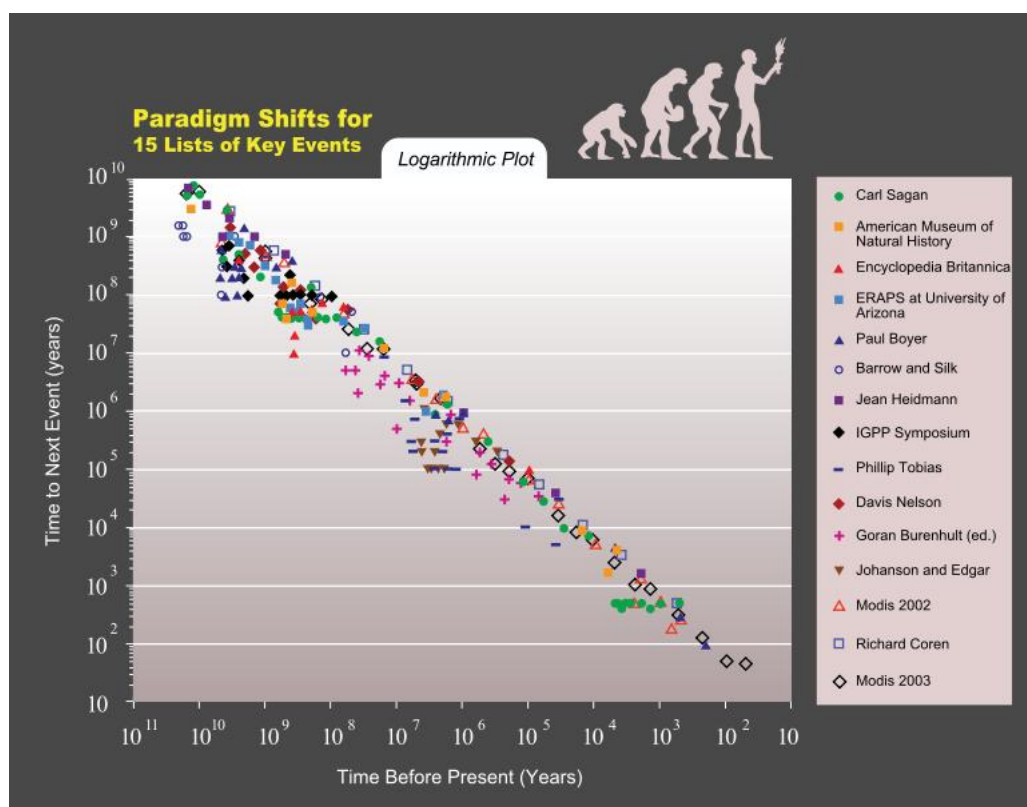
The Futurist · 20 August 2009 · Archived copy · Original

(See the 10-yr update [here](#)). The Singularity. The event when the rate of technological change becomes human-surpassing, just as the advent of human civilization a few millennia ago surpassed the comprehension of non-human creatures. So when will this event happen?

There is a great deal of speculation on the 'what' of the Singularity, whether it will create a utopia for humans, cause the extinction of humans, or some outcome in between. Versions of optimism (Star Trek) and pessimism (The Matrix, Terminator) all become fashionable at some point. No one can predict this reliably, because the very definition of the singularity itself precludes such prediction. **Given the accelerating nature of technological change**, it is just as hard to predict the world of 2050 from 2009, as it would have been to predict 2009 from, say, 1200 AD. So our topic today is not going to be about the 'what', but rather the 'when' of the Singularity.

Let us take a few independent methods to arrive at estimations on the timing of the Singularity.

1) Ray Kurzweil has constructed this logarithmic chart that combines 15 unrelated lists of key historic events since the Big Bang 15 billion years ago. The exact selection of events is less important than the undeniable fact that the intervals between such independently selected events are shrinking exponentially. This, of course, means that the next several major events will occur within single human lifetimes.



Kurzweil wrote with great confidence, in 2005, that the Singularity would arrive in 2045. One thing I find about Kurzweil is that he usually predicts the *nature* of an event very accurately, but overestimates the *rate* of progress by 50%. Part of this is because he insists that computer power per dollar doubles every year, when it actually doubles every 18 months, which results in every other date he predicts to be distorted as a downstream byproduct of this figure. Another part of this is that Kurzweil, born in 1948, is famously taking extreme measures to extend his lifespan, and quite possibly may have an expectation of living until 100 but not necessarily beyond that. A Singularity in 2045 would be before his century mark, but herein lies a lesson for us all. Those who have a positive expectation of what the Singularity will bring tend to have a subconscious bias towards estimating it to happen within their expected lifetimes. We have to be watchful enough to not let this bias influence us. So when Kurzweil

says that the Singularity will be 40 years from 2005, we can apply the discount to estimate that it will be 60 years from 2005, or in 2065.

2) John Smart is a brilliant futurist with a distinctly different view on accelerating change from Ray Kurzweil, but he has produced very little visible new content in the last 5 years. **In 2003, he predicted the Singularity for 2060, +/- 20 years.** Others like Hans Moravec and Vernor Vinge also have declared predictions at points in the mid/late 21st century.

3) Ever since the start of the fictional Star Trek franchise in 1966, they have made a number of predictions about the decades since, with impressive accuracy. In Star Trek canon, humanity experiences a major acceleration of progress starting from 2063, upon first contact with an extraterrestrial civilization. **While my views on first contact are somewhat different from the Star Trek prediction,** it is interesting to note that their version of a 'Singularity' happened to occur in 2063 (as per the 1996 film *Star Trek : First Contact*).

4) Now for my own methodology. We shall first take a look at novel from 1863 by Jules Verne, titled "Paris in the 20th Century". Set about a century in the future from Verne's perspective, the novel predicts innovations such as air conditioning, automobiles, helicopters, fax machines, and skyscrapers in detail. Such accuracy makes Jules Verne the greatest futurist of the 19th century, but notice how his predictions involve innovations that occurred within 120 years of writing. Verne did not predict exponential growth in computation, genomics, artificial intelligence, cellular phones, and other innovations that emerged more than 120 years after 1863. Thus, Jules Verne was up against a 'prediction wall' of 120 years, which was much longer than a human lifespan in the 19th century.

But now, the wall is closer. In the 3.5 years since the inception of The Futurist, **I have consistently noticed a 'prediction wall' on all long-term forecasts, that makes it very difficult to make specific predictions beyond 2040 or so.** In contrast, it was not very hard to predict the state of technology in 1930 from the year 1900, just 30 years prior. Despite all the inventions between 1900 and 1930, **the diffusion rate was very slow, and it took well over 30 years for many innovations to affect the majority of the population. The diffusion rate of innovation is much faster today, and the pervasive Impact of Computing is impossible to ignore.** This 'event horizon' that we now see does not mean the Singularity will be as soon as 2040, as the final couple of decades before the Singularity may still be too fast to make predictions about until we get much closer. But the compression of such a wall/horizon from 120 years in Jules Verne's time to 30 years today gives us some idea of the second derivative in the rate of change, and many other top futurists have observed the same approaching phenomenon. By 2030, the prediction wall may thus be only 15 years away. By the time of the Singularity, the wall would be almost immediately ahead from a human perspective.

So we can return to **the Impact of Computing as a driver of the 21st century economy.** In the article, I have written about how about \$700 Billion per year as of 2008, which is 1.5% of World GDP, comprises of products that improve at an average of 59% a year per dollar spent. Moore's Law is a subset of this, but this cost deflation applies to storage, software, biotechnology, and a few other industries as well.

If products tied to the Impact of Computing are 1.5% of the global economy today, what happens when they are 3%? 5%? Perhaps we would reach a Singularity when such products are 50% of the global economy, because from that point forward, the other 50% would very quickly diminish into a tiny percentage of the economy, particularly if that 50% was occupied by human-surpassing artificial intelligence.

Year of Singularity		% of 2009 World GDP Subject to Impact of Computing		
		1	1.5	2
% Rate of Increase in Impact of Computing share of Economy	6	2075	2068	2063
	7	2066	2060	2056
	8	2059	2054	2050

We can thus calculate a range of dates by when products tied to the Impact of Computing become more than half of the world economy. In the table, the columns signify whether one assumes that 1%, 1.5%, or 2% of the world economy is currently tied, and the rows signify the rate at which this percentage share of the economy is increasing, whether 6%, 7%, or 8%. This range is derived from the fact that the semiconductor industry has a 12-14% nominal growth trend, while nominal world GDP grows at 6-7% (some of which is inflation). Another way of reading the table is that if you consider the Impact of Computing to affect 1% of World GDP, but that share grows by 8% a year, then that 1% will cross the 50% threshold in 2059. Note how a substantial downward revision in the assumptions moves the date outward only by years, rather than centuries or even decades.

We see these parameters deliver a series of years, with the median values arriving at around the same dates as aforementioned estimates. Taking all of these points in combination, we can predict the timing of the Singularity.

I hereby predict that the Technological Singularity will occur in :

2060-65 $\pm$ 10 years

Hence, the earliest that it can occur is 2050 (hence the URL of this site), and the latest is 2075, with the highest probability of occurrence in 2060-65. There is virtually no statistical probability that it can occur outside of the 2050-75 range.

So now we know the 'when' of the Singularity. We just don't know the 'what', nor can we with any certainty.

Related :

[The Impact of Computing](#)

[Are You Acceleration Aware?](#)

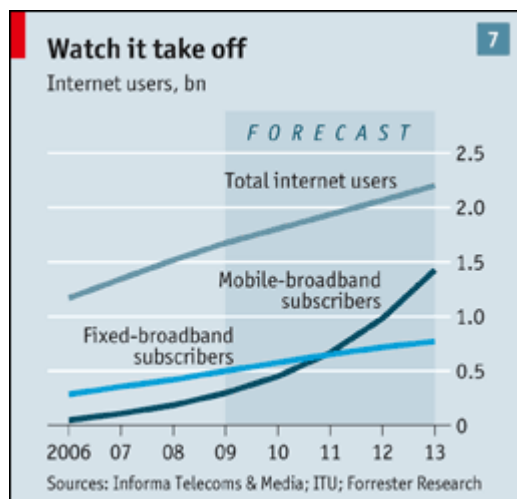
[Pre-Singularity Abundance Milestones](#)

[SETI and the Singularity](#)

Mobile Broadband Surge : A Prediction Follow Up

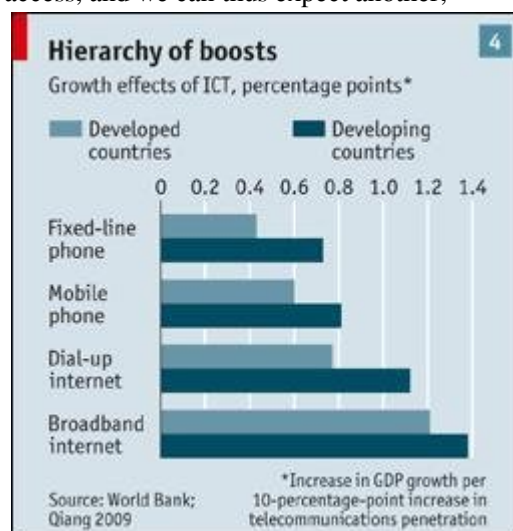
The Futurist · 5 October 2009 · Archived copy · Original

Some of you may recall that over three and a half years ago, on February 4, 2006, I predicted that by 2013, at least 900 million people in emerging nations, 80% of whom had no Internet connection in 2006, would have access to a wireless broadband connection through their cellphones. That seemed like a bold prediction at the time.



But in the Economist, there is a special report on mobile phones in the developing world, and this chart depicts the progress towards my prediction quite nicely. Mobile broadband subscribers will go from nearly zero in early 2006 when the prediction was first made, to 1.4 billion by 2013 (of which 900 million can safely be assumed to be in emerging nations).

It is often said that no other invention has done more for so many people so quickly than the mobile phone, given the large number of people who did not have even a landline phone prior to getting a mobile phone. However, the initial deployment of rudimentary mobile phones was just the beginning. As 3G broadband at speeds greater than 1 mbps spread to a billion people with no prior Internet access, the entire nature of their existence is transformed. As per this second chart from the Economist report, the GDP boost from broadband Internet penetration is far higher than the already-impressive boost we have seen from simple mobile access, and we can thus expect another,



stronger wave of human advancement as mobile broadband diffuses.

Simultaneously, the entire nature of the Internet is also transformed. Think of the massive developmental catalyst such a rapid technological diffusion would be. Child literacy would rise as the educational materials of the full Internet will be available in locations where no libraries exist, making near-universal child literacy a reality within a decade. Agricultural and fishery supply chains will shorten tremendously. Disaster relief will become far easier, as will the apprehension of criminals. The upliftment that once appeared to be a process of decades will now happen in mere years.

We can thus proceed to the next prediction, which is that **by 2020, 4 billion people will have 4G wireless broadband access on their handheld mobile phone, at speeds exceeding 100 Mbps.** In other words, a landline speed that even wealthy Americans could not have in 2005 will be available wirelessly to billions of the very poorest people just 15 years later, in 2020. Imagine that.

Energy vs. Financials, FINAL RESULTS

The Futurist · 12 November 2009 · Archived copy · Original

Many of you may be familiar with this sectoral strategy that I have presented, which was due to the unusually wide extreme to which these two sectors had diverged from each other as of April 22, 2008. To review :

On April 22, 2008, I decided to go short on Energy (XLE) and long on Financials (XLF).

Then, on May 20, 2009, I decided to cover the Energy short, and use the proceeds to double down on Financials. Up till that point, the trade had earned a loss of -5.36%, vs. a loss of -32.20% for the S&P500.

Now, it is time to sell the Financials position, and assess the final performance over the entire 18-month period, against the S&P 500.



The purple line indicates the May 20, 2009 transition from being short XLE to covering that short and using the full proceeds to double down on XLF. Note that the short of XLE was profitable, so that the amount that was redeployed to XLF was more than the existing value of the XLF position.

Therefore, the final results are (with all dividends reinvested) :

Date	Strategy Returns	S&P500 Returns
4/22/2008	□	□
5/20/2009	-5.36%	-32.20%
11/11/2009	21.92%	-17.19%

This strategy yielded a gain of 21.92% vs. a loss of -17.19% for the S&P500. This is a huge gap of almost 40 points, and means that \$10,000 deployed to this strategy would have yielded \$12,192, vs. just \$8,281 if placed in the S&P500 over this period. Also note how the gap widened from what it was on May 20, 2009.

This continues [our track record here at The Futurist](#) of collectively beating the market by a wide margin, with portfolios that beat the market greatly exceeding the deficit of those that do not. Of course, these trades are for entertainment purposes only, and should not be taken as professional advice.

Related :

[A History of Stock Market Bottoms](#)

The Winds of War, The Sands of Time, v2.0

The Futurist · 21 November 2009 · Archived copy · Original



This is a version 2.0 of a [legendary article written here back on March 19, 2006](#), noticed and linked by Hugh Hewitt, which led to The Futurist getting on the blogosphere map for the first time. Less than four years have elapsed since the original publication, but the landscape of global warfare has changed substantially over this time, warranting an update to the article.

In the mere 44 months since the original article was written, what seemed impossible has become a reality. The US now has an upper hand against terrorist groups like Al-Qaeda, despite the seemingly impossible task of fighting suicidal terrorists. As regular readers of The Futurist are aware, [I issued a prediction in May of 2006, during the darkest days of the Iraq War, that not only would the US win, but that the year of victory would be precisely in 2008](#). As events unfolded, [that prediction turned out to be precisely correct](#). As readers continue to ask how I was able to make such a prediction against seemingly impossible odds, I claim that it is not very difficult, once you understand the necessary conditions of war and peace within the human mind.

Given the massive media coverage of the minutia of the Iraq War, and the fashionable fad of being opposed to it, one could be led to think that this is one of the most major wars ever fought. Therein lies the proof that we are actually living in the most peaceful time ever in human history.

Just a few decades ago, wars and genocides killing upwards of a million people were commonplace, with more than one often underway at once. Remember these?

[Second Congo War](#) (1998-2002) : 3.6 million deaths

[Iran-Iraq War](#) (1980-88) : 1.5 million deaths

[Soviet Invasion of Afghanistan](#) (1979-89) : 1 million deaths

[Khmer Rouge](#) (1975-79) : 1.7 million deaths from genocide

[Bangladesh Liberation War](#) (1971) : 1.5 million deaths from genocide

[Vietnam War](#) (1957-75) : 2.4 million deaths

[Korean War](#) (1950-53) : 3 million deaths

This list is by no means complete, as wars killing fewer than one million people are not even listed. [At least 30 other wars killed over 20,000 people each, between 1945 and 1989](#).

If we go further back [to the period from 1900-1945](#), we can see that multiple wars were being simultaneously fought across the world. Going further back still, [the 19th century had virtually no period without at least two major wars being fought](#).

We can thus conclude that by historical standards, the current Iraq War was tiny, and can barely be found [on the list of historical death tolls](#). That it got so much attention merely indicates how little warfare is going on in the world,

and how ignorant of historical realities most people are.

Why have so many countries quietly adapted to peaceful coexistence? Why is a war between Britain and France, or Russia and Germany, or the US and Japan, nearly impossible today? Why are we not seeing a year like 1979, where the entire continent of Asia threatened to fly apart due to three major events happening at once (Iranian Revolution, **Soviet Invasion of Afghanistan**, **Chinese invasion of VietNam**)?

[image] We can start with the observation that never have two democratic countries, with per-capita GDPs greater than \$10,000/year on a PPP basis, gone to war with each other. The decline in warfare in Europe and Asia correlates closely with multiple countries meeting these two conditions over the last few decades, and this can continue as more countries graduate to this standard of freedom and wealth. The chain of logic is as follows :

- 1) Nations with elected governments and free-market systems tend to be the overwhelming majority of countries that achieve per-capita incomes greater than \$10,000/year. Only a few petro-tyrannies are the exception to this rule.
- 2) A nation with high per-capita income tends to conduct extensive trade with other nations of high prosperity, resulting in the ever-deepening integration of these economies with each other. A war would disrupt the economies of both participants as well as those of neutral trading partners. Since the citizens of these nations would suffer financially from such a war, it is not considered by elected officials.
- 3) As more of the world's people gain a vested interest in the stability and health of the interlocking global economic system, fewer and fewer countries will consider international warfare as anything other than a lose-lose proposition.
- 4) More nations can experience their citizenry moving up **Maslow's Hierarchy of Needs**, allowing knowledge-based industries thrive, and thus making international trade continuously easier and more extensive.
- 5) Since **economic growth is continuously accelerating**, many countries have crossed the \$10,000/yr barrier in just the last 20 years, and so the reduction in warfare after 1991 years has been drastic even if there was little apparent reduction over the 1900-1991 period.

This explains the dramatic decline in war deaths across Europe, East Asia, and Latin America over the last few decades. Thomas Friedman has a similar theory, called the Dell Theory of Conflict Prevention, wherein no two countries linked by a major supply chain/trade network (such as that of a major corporation like Dell Computer), have ever gone to war with each other, as the cost of losing the presence of major industries through war is prohibitive to both parties. If this is the case, then the combinations of countries that could go to war with each other continues to drop quickly.

To predict the future risk of major wars, we can begin by assessing the state of some of the largest and/or riskiest countries in the world. Success at achieving democracy and a per-capita GDP greater than \$10,000/yr are highlighted in green. We can also throw in the **UN Human Development Index**, which is a composite of these two factors, and track the rate of progress of the HDI over the last 30 years. In general, countries with scores greater than 0.850, consistent with near-universal access to consumer-class amenities, have met the aforementioned requirements of prosperity and democracy. There are **many more countries with a score greater than 0.850 today than there were in 1975**.

Let's see how some select countries stack up.

	Pop. (M)	2008 GDP/person (PPP)	Democracy	HD Score 1975	HD Score 2007
China	1334	\$6,000	No	0.500	0.772
India	1172	\$2,900	Yes	0.412	0.612
Russia	142	\$16,100	No	0.800	0.817
Iran	74	\$12,800	No	0.566	0.782
Iraq	30	\$3,700	Yes	~0.500	0.583
Indonesia	231	\$3,900	Yes	0.468	0.734
Pakistan	168	\$2,500	No	0.363	0.572

China : The per-capita income is rapidly closing in on the \$10,000/yr threshold, but democracy is a distant dream. I have stated that China will see a sharp economic slowdown in the next 10 years unless they permit more personal freedoms, and thus nurture entrepreneurship. Technological forces will continue to pressure the Chinese Communist Party, and if this transition is moderately painless, the ripple effects will be seen in most of the other communist or autocratic states that China supports, and will move the world strongly towards greater peace and freedom. The single biggest question for the world is whether China's transition happens without major shocks or bloodshed. I am optimistic, as I believe the CCP is more interested in economic gain than clinging to an ideology and one-party rule, which is a sharp contrast from the Mao era where 40 million people died over ideology-driven economic schemes. **Cautiously optimistic.**

India : A secular democracy has existed for a long time, but economic growth lagged far behind. Now, India is catching up, and will soon be a bulwark for democracy and stability for the whole world. Some of the most troubled countries in the world, from Burma to Afghanistan, border India and could transition to stability and freedom under India's sphere of influence. India is only now realizing how much the world will depend on it. **Optimistic.**

Russia : A lack of progress in the HDI is a total failure, enabling many countries to overtake Russia over the last 15 years. Putin's return to dictatorial rule is a further regression in Russia's progress. Hopefully, energy and technology industries can help Russia increase its population growth rate, and up its HDI. **Cautiously optimistic.**

Indonesia : With more Muslims than the entire Middle East put together, Indonesia took a large step towards democracy in 1999 (improving its HDI score), and is doing moderately well economically. Economic growth needs to accelerate in order to cross \$10,000/yr per capita by 2020. **Cautiously optimistic.**

Pakistan : My detailed Pakistan analysis is [here](#). The divergence between the paths of India and Pakistan has been recognized by the US, and Pakistan, with over 50 nuclear warheads, is also where Osama bin Laden and thousands of other terrorists are currently hiding. Any 'day of infamy' that the US encounters will inevitably be traced to individuals operating in Pakistan, which has regressed from democracy to dictatorship, and is teetering on the edge of religious fundamentalism. The economy is growing quickly, however, and this is the only hope of averting a disaster. Pakistan will continue to struggle between emulating the economic progress of India against descending into the dysfunction of Afghanistan. **Pessimistic.**

Iraq : Although Iraq is not a large country, its importance to the world is disproportionately significant. Bordering so many other non-democratic nations, our hard-fought victory in Iraq now places great pressure on all remaining Arab states. The destiny of the US is also intertwined with Iraq, as the outcome of the current War in Iraq will determine the ability of America to take any other action, against any other nation, in the future. **Optimistic.**

Iran : Many would be surprised to learn that Iran is actually not all that poor, and the Iranian people have enough to lose that they are not keen on a large war against a US military that could dispose of Iran's military just as quickly as they did Saddam's. However, the autocratic regime that keeps the Iranian people suppressed has brutally quashed democratic movements, most recently in the summer of 2009. The secret to turning Iran into a democracy is its neighbor, Iraq. If Iraq can succeed, the pressure on Iran exerted by Internet access and globalization next door will be immense. This will continue to nibble at the edges of Iranian society, and the regime will collapse before 2015 even without a US invasion. If Iran's leadership insists on a confrontation over their nuclear program, the

regime will collapse even sooner. **Cautiously optimistic.**

So Iraq really is a keystone state, and the struggle to prevail over the forces that would derail democracy has major repercussions for many nations. The US, and the world, could not have afforded for the US mission in Iraq to fail. But after the success in Iraq, all remaining roads to disastrous tragedy lead to Pakistan. **The country in which the leadership of Al-Qaeda resides is the same country where the most prominent nuclear scientist was caught selling nuclear secrets on the black market.** This is simply the most frightening combination of circumstances that exists in the world today, far more troubling than anything directly attributable to Iran or North Korea.

But smaller-scale terrorism is nothing new. It just was not taken as seriously back when nations were fighting each other in much larger conflicts. The **1983 Beirut bombing** that killed 241 Americans did not dominate the news for more than two weeks, as it was during the far more serious Cold War. Today, the *absence* of wars between nations brings terrorism into the spotlight that it could not have previously secured.

Wars against terrorism have been a paradigm shift, because where a war like World War II involved symmetrical warfare between declared armies, the War on Terror involves *asymmetrical* warfare in *both* directions. Neither party has yet gained a full understanding of the power it has over the other.



A few terrorists with a small budget can kill thousands of innocents without confronting a military force. Guerilla warfare can tie down the mighty US military for years until the public grows weary of the stalemate, even while the US cannot permit itself to use more than a tiny fraction of its power in retaliation. Developed nations spend vastly more money on political and media activities centered around the mere discussion of terrorism than the terrorists themselves need to finance a major attack on these nations.

At the same time, pervasively spreading Internet access, satellite television, and consumer brands continue to disseminate globalization and lure the attention of young people in terrorist states. We saw exactly this in Iran in the summer of 2009, where state-backed murders of civilian protesters were videotaped by cameraphone, and immediately posted online for the world to see. This unrelentingly and irreversibly erodes the fabric of pre-modern fanaticism at almost no cost to the US and other free nations. The efforts by fascist regimes to obstruct the mists of the information ethersphere from entering their societies is so futile as to be comical, and the Iranian regime may not survive the next uprising, when even more Iranians will have camera phones handy. Bidirectional asymmetry is the new nature of war, and the side that learns how to harness the asymmetrical advantage it has over the other is the side that will win.

It is the wage of prosperous, happy societies to be envied, hated, and forced to withstand threats that they cannot reciprocate back onto the enemy. The US has overcome foes as formidable as the Axis Powers and the Soviet Union, yet we managed to adapt and gain the upper hand against a pre-modern, unprofessional band of deviants that does not even have the resources of a small nation and has not invented a single technology. The War on Terror was thus ultimately not with the terrorists, but with ourselves - our complacency, short attention spans, and propensity for fashionable ignorance over the lessons of history.

But 44 months turned out to be a very long time, during which we went from a highly uncertain position in the War on Terror to one of distinct advantage. Whether we continue to maintain the upper hand that we currently have, or become too complacent and let the terrorists kill a million of us in a day remains to be seen.

The Publishing Disruption

The Futurist · 13 December 2009 · Archived copy · Original

What a unique thing a book is. Made from a tree, it has a hundred or more flexible pages that contain written text, enabling the book to contain a large sum of information in a very small volume. Before paper, clay tablets, sheepskin parchment, and papyrus were all used to store information with far less efficiency. Paper itself was once so rare and valuable that the Emperor of China had guards stationed around his paper possessions.

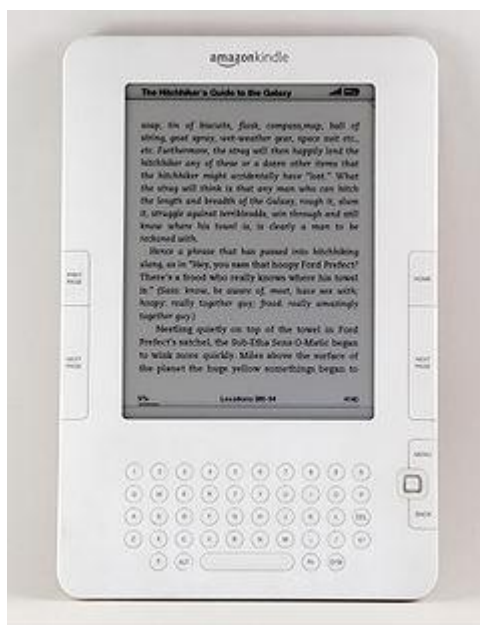
Before the invention of the printing press, books were written by hand, and few outside of monasteries knew how to read. There were only a few thousand books in all of Europe in the 14th century. Charlemagne himself took great effort to learn how to read, but never managed to learn how to write, which still put him ahead of most kings of the time, who were generally illiterate.

But with the invention of the printing press by Johannes Gutenberg in the mid-15th century, it became possible to make multiple copies of the same book, and before long, the number of books in Europe increased from thousands to millions.

Fast forward to the early 21st century, and books are still printed by the millions. Longtime readers of The Futurist know that I initially had written a book (2001-02), and sought to have it published the old-fashioned way. However, the publishing industry, and literary agents, were astonishingly low-tech. They did not use email, and required queries to be submitted via regular mail, with a self-addressed, stamped envelope included. So I had to pay postage in both directions, and wait several days for a round trip to hear their response. And this was just the literary agents. The actual publishing house, if they decide to accept your book, would still take 12 months to produce and distribute the book even after the manuscript was complete. Even then, royalties would be 10-15% of the retail price. This prospect did not seem compelling to me, and I chose to parse my book into this blog you see before you.

The refusal by the publishing industry to use email and other productivity-enhancing technologies as recently as 2003 kept their wages low. Editors always moaned that they worked 60 hours a week just to make \$50,000 a year, the same as they made in 1970. My answer to them is that they have no basis to expect wage increases without increasing their productivity through technology.

In the meantime, self-publishing technologies emerged to bypass the traditional publishers' role as arbiters of what can become a book and what cannot. From Lulu to iUniverse to BookSmart, any individual can produce a book, with copies that can be printed on demand. Instances where an individual is seeking to go it alone without being saddled with a huge upfront inventory production and storage burden, or is otherwise marketing to only a tiny audience, have flourished. But print-on-demand is not the true disruption - that was yet to come.



The Amazon Kindle launched in late 2007 at the high price of \$400.

Within 2 years, a substantially more advanced Kindle 2 was available for a much lower price of \$260, alongside competing readers from several other companies. Many people feel that the appeal of holding a physical book in our hands cannot be replaced by a display screen, and take a cavalier attitude towards dismissing e-readers. The tune changes upon learning that the price of a book on an e-reader is just a third of what the paper form at a brick-and-mortar bookstore, with sales tax, would cost. Market research firm iSuppli estimates that 5 million readers have been sold in 2009, and another 12 million will sell in 2010. Amazon estimates that over one-third of its book sales are now through the kindle, greatly displacing sales of paper books.

Imagine what happens when the Kindle and other e-readers cost only \$100. Brick and mortar bookstores will consolidate to fewer premises, extract profits mainly from picture-heavy books and magazines, and step up their positioning as literary coffeehouses. Many employees and affiliates of the publishing industry will see their functions eliminated as part of the productivity gains. College students forced to pay \$100 for a textbook produced in small quantities will now pay only \$20 for an e-reader version. But even this is not the ultimate endgame of disruption.



Intel now has a reader for the visually impaired that scans text from paper books, and reads them in an acceptable audio voice. It is reported that with practice, an audio rate of 250 words per minute can be coherent. While the reader costs \$1500, and requires a user to turn pages manually, it is a matter of time before not only the reader's price drops, and more and more books are available as text files similar to those contained in e-readers like the Kindle. There are already books available as free downloads of text files under the ironically named Project Gutenberg.

Therein lies the crescendo of disruption. The Intel Reader is a \$1500 device for the visually impaired, but will soon evolve into a technology that interfaces with Kindle-type e-readers and chatters off e-books at 250 words/minute, from the full e-book library that is vastly larger than any traditional collection of audiobooks. A 90,000-word novel could be recited in just 6 hours, enabling a user to imbibe the whole book during a single coast-to-coast flight, even if the lights are dimmed. People could further choose to preserve their vision at home, devouring book after book with the lights out. As the technology advances further, the speech technology will allow the user to select a voice of his choosing to be read to in, perhaps even his own voice.

Thus, without many people even noticing the murmurs, we can predict that the next 3 years will see the biggest transformation in book production and consumption since the days of Johannes Gutenberg. That is a true demonstration of both the **Accelerating Rate of Change** and **The Impact of Computing**.

The Misandry Bubble

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(the 1/1/2020 sequel is in my portion of [this article here](#)).

- by Imran Khan

Why does it seem that American society is in decline, that fairness and decorum are receding, that mediocrity and tyranny are becoming malignant despite the majority of the public being averse to such philosophies, yet the true root cause seems elusive? What if everything from unsustainable health care and social security costs, to stagnant wages and rising crime, to crumbling infrastructure and metastasizing socialism, to the economic decline of major US cities like Detroit, Cleveland, and Baltimore, could all be traced to a common origin that is extremely pervasive yet is all but absent from the national dialog, indeed from the dialog of the entire Western world?

Today, on the first day of the new decade of '201x' years, I am going to tell you why that is. I am hereby triggering the national dialog on what the foremost challenge for the United States will be in this decade, which is the ultimate root cause of most of the other problems we appear to be struggling with. What you are about to read is the equivalent of someone in 1997 describing the expected forces governing the War on Terror from 2001-2009 in profound detail.

This is a very long article, the longest ever written on The Futurist. As it is a guide to the next decade of social, political, and sexual strife, it is not meant to be read in one shot but rather digested slowly over an extended period, with all supporting links read as well (if those links are still active after years pass). As the months and years of this decade progress, this article will seem all the more prophetic.

Executive Summary : The Western World has quietly become a civilization that has tainted the interaction between men and women, where the state forcibly transfers resources from men to women creating various perverse incentives for otherwise good women to make extremely unwise life choices, destructive to both themselves and others. This is unfair to both genders, and is a recipe for a rapid civilizational decline and displacement, the costs of which will ultimately be borne by a subsequent generation of innocent women, rather than men, as soon as 2020. The primary culprits in perpetuating this injustice are not average women, but radical 'feminists' and an assortment of sinister, dishonest men who variously describe themselves as 'male feminists' or 'social conservatives'.

Now, the basic premise of this article is that men and women are equally valuable, but have different strengths and weaknesses, and different priorities. A society is strongest when men and women have roles that are complementary to each other, rather than of an adversarial nature. Furthermore, when one gender (either one) is mistreated, the other ends up becoming disenfranchised as well. If you disagree with this premise, you may not wish to read further.



The Cultural Thesis

The Myth of Female Oppression : When you tell someone that they are oppressed, against all statistical and logical evidence, you harm them by generating discouragement and resentment. This pernicious effect is the basis of many forms of needlessly inflicted female unhappiness, as well as the basis for unjustified retaliation against men.

All of us have been taught how women have supposedly been oppressed throughout human existence, and that this was pervasive, systematic, and endorsed by ordinary men who did not face hardships as severe as what women

endured. In reality, this narrative is entirely incorrect. The average man was forced to risk death on the battlefield, at sea, or in mines, while most women stayed indoors tending to children and household duties. Male life expectancy was always significantly lower than that of females, and still is.

Warfare has been a near constant feature of human society before the modern era, and whenever two tribes or kingdoms went to war with each other, the losing side saw many of its fighting-age men exterminated, while the women were assimilated into the invading society. Now, becoming a concubine or a housekeeper is an unfortunate fate, but not nearly as bad as being slaughtered in battle as the men were. To anyone who disagrees, would you like for the men and women to trade outcomes?

Most of this narrative stems from 'feminists' comparing the plight of average women to the topmost men (the monarch and other aristocrats), rather than to the average man. This practice is known as *apex fallacy*, and whether accidental or deliberate, entirely misrepresents reality. To approximate the conditions of the *average* woman to the *average* man (the key word being 'average') in the Western world of a century ago, simply observe the lives of the poorest peasants in poor countries today. Both men and women have to perform tedious work, have insufficient food and clothing, and limited opportunities for upliftment.

As far as selective anecdotes like voting rights go, in the vast majority of cases, men could not vote either. In fact, if one compares every nation state from every century, virtually all of them extended exactly the same voting rights (or lack thereof) to men and women. Even today, out of 200 sovereign states, there are exactly zero that have a different class of voting rights to men and women. Any claim that women were being denied rights that men were given in even 1% of historical instances, falls flat.

This is not to deny that genuine atrocities like genital mutilation have been perpetrated against women; they have and still are. But men also experienced atrocities of comparable horror at the same time, which is simply not mentioned. In fact, **when a man is genitally mutilated by a woman, some other women actually find this humorous, and are proud to say so publicly.**

It is already wrong when a contemporary group seeks reparations from an injustice that occurred over a century ago to people who are no longer alive. It is even worse when this oppression itself is a fabrication. The narrative of female oppression by men should be rejected and refuted as the highly selective and historically false narrative that it is. In fact, this myth is evidence not of historical oppression, but of the vastly different propensity to complain between the two genders.

The Masculinity Vacuum in Entertainment : Take a look at the collage of entertainers below (click to enlarge), which will be relevant if you are older than 30. All of them were prominent in the 1980s, some spilling over on either side of that decade. They are all certainly very different from one another. But they have one thing in common - that there are far fewer comparable personas produced by Hollywood today.



As diverse and imperfect as these characters were, they

were all examples of masculinity. They represented different archetypes, from the father to the leader to the ladies man to the rugged outdoorsman to the protector. They were all more similar than dissimilar, as they all were role-models for young boys of the time, often the same young boys. Celebrities as disparate as Bill Cosby and Mr. T had majority overlap in their fan bases, as did characters as contrasting as Jean-Luc Picard and The Macho Man Randy Savage.

At this point, you might be feeling a deep inner emptiness lamenting a bygone age, as the paucity of proudly, inspiringly masculine characters in modern entertainment becomes clear. Before the 1980s, there were different masculine characters, but today, they are conspicuously absent. Men are shown either as thuggish degenerates, or as effete androgynes. Sure, there were remakes of Star Trek and The A-Team, and series finales of Rocky and Indiana Jones. But where are the new characters? Why is the vacuum being filled solely with nostalgia? A single example like Jack Bauer is not sufficient to dispute the much larger trend of masculinity purging.

Modern entertainment typically shows businessmen as villains, and husbands as bumbling dimwits that are always under the command of the all-powerful wife, who is never wrong. Oprah Winfrey's platform always grants a sympathetic portrayal to a wronged woman, but never to men who have suffered great injustices. Absurdly false feminist myths such as a belief that women are underpaid relative to men for the same output of work, or that adultery and domestic violence are actions committed exclusively by men, are embedded even within the dialog of sitcoms and legal dramas.

This trains women to disrespect men, wives to think poorly of their husbands, and girls to devalue the importance of their fathers, which leads to the normalization of single motherhood (obviously with taxpayer subsidies), despite the reality that most single mothers are not victims, but merely women who rode a carousel of men with reckless abandon. This, in turn, leads to fatherless young men growing up being told that natural male behavior is wrong, and feminization is normal. It also leads to women being deceived outright about the realities of the sexual market, where media attempts to normalize single motherhood and attempted 'cougarhood' are glorified, rather than portrayed as the undesirable conditions that they are.

The Primal Nature of Men and Women : Genetic research has shown that before the modern era, **80% of women managed to reproduce, but only 40% of men did**. The obvious conclusion from this is that a few top men had multiple wives, while the bottom 60% had no mating prospects at all. Women clearly did not mind sharing the top man with multiple other women, ultimately deciding that being one of four women sharing an 'alpha' was still more preferable than having the undivided attention of a 'beta'. Let us define the top 20% of men as measured by their attractiveness to women, as 'alpha' males while the middle 60% of men will be called 'beta' males. The bottom 20% are not meaningful in this context.

Research across gorillas, chimpanzees, and primitive human tribes shows that men are promiscuous and polygamous. **This is no surprise to a modern reader, but the research further shows that women are not monogamous, as is popularly assumed, but hypergamous**. In other words, a woman may be attracted to only one man at any given time, but as the status and fortune of various men fluctuates, a woman's attention may shift from a declining man to an ascendant man. There is significant turnover in the ranks of alpha males, which women are acutely aware of.

As a result, women are the first to want into a monogamous relationship, and the first to want out. This is neither right nor wrong, merely natural. What is wrong, however, is the cultural and societal pressure to shame men into committing to marriage under the pretense that they are 'afraid of commitment' due to some 'Peter Pan complex', while there is no longer the corresponding traditional shame that was reserved for women who destroyed the marriage, **despite the fact that 90% of divorces are initiated by women**. Furthermore, when women destroy the commitment, there is great harm to children, and the woman demands present and future payments from the man she is abandoning. A man who refuses to marry is neither harming innocent minors nor expecting years of payments from the woman. This absurd double standard has invisible but major costs to society.

To provide 'beta' men an incentive to produce far more economic output than needed just to support themselves

while simultaneously controlling the hypergamy of women that would deprive children of interaction with their biological fathers, all major religions constructed an institution to force constructive conduct out of both genders while penalizing the natural primate tendencies of each. This institution was known as 'marriage'. Societies that enforced monogamous marriage made sure all beta men had wives, thus unlocking productive output out of these men who in pre-modern times would have had no incentive to be productive. Women, in turn, received a provider, a protector, and higher social status than unmarried women, who often were trapped in poverty. When applied over an entire population of humans, this system was known as 'civilization'.

All societies that achieved great advances and lasted for multiple centuries followed this formula with very little deviation, and it is quite remarkable how similar the nature of monogamous marriage was across seemingly diverse cultures. Societies that deviated from this were quickly replaced. This 'contract' between the sexes was advantageous to beta men, women over the age of 35, and children, but greatly curbed the activities of alpha men and women under 35 (together, a much smaller group than the former one). Conversely, the pre-civilized norm of alpha men monopolizing 3 or more young women each, replacing aging ones with new ones, while the masses of beta men fight over a tiny supply of surplus/aging women, was chaotic and unstable, leaving beta men violent and unproductive, and aging mothers discarded by their alpha mates now vulnerable to poverty. So what happens when the traditional controls of civilization are lifted from both men and women?

The Four Sirens : Four unrelated forces simultaneously combined to entirely distort the balance of civilization built on the biological realities of men and women. **Others have presented versions of the Four Sirens concept in the past**, but I am choosing a slightly different definition of the Four Sirens :

1) **Easy contraception (condoms, pills, and abortions)**: In the past, extremely few women ever had more than one or two sexual partners in their lives, as being an unwed mother led to poverty and social ostracization. Contraception made it possible for females to act on their urges of hypergamy.

2) **'No fault' divorce, asset division, and alimony** : In the past, a woman who wanted to leave her husband needed to prove misconduct on his part. Now, the law has changed to such a degree that a woman can leave her husband for no stated reason, yet is still entitled to payments from him for years to come. This incentivizes destruction because it enables women to transfer the costs of irresponsible behavior onto men and children.

3) **Female economic freedom** : Despite 'feminists' claiming that this is the fruit of their hard work, inventions like the vacuum cleaner, washing machine, and oven were the primary drivers behind liberating women from household chores and freeing them up to enter the workforce. These inventions compressed the chores that took a full day into just an hour or less. There was never any organized male opposition to women entering the workforce (in China, taxes were collected in a way that mandated female productivity), as more labor lowered labor costs while also creating new consumers. However, one of the main reasons that women married - financial support - was no longer a necessity.

Female entry into the workforce is generally a positive development for society, and I would be the first to praise this, if it were solely on the basis of merit (as old-school feminists had genuinely intended).

Unfortunately, **too much of this is now due to corrupt political lobbying to forcibly transfer resources from men to women.**

4) **Female-Centric social engineering** : Above and beyond the pro-woman divorce laws, further state interventions include the subsidization of single motherhood, laws that criminalize violence against women (but offer no protection to men who are the victims of violence by women, **which happens just as often**), and 'sexual harassment' laws with definitions so nebulous that women have the power to accuse men of anything without the man having any rights of his own.

These four forces in tandem handed an unprecedented level of power to women. The technology gave them freedom to pursue careers and the freedom to be promiscuous. Feminist laws have done a remarkable job of shielding women from the consequences of their own actions. Women now have as close to a hypergamous utopia

as has ever existed, where they can pursue alpha males while extracting subsidization from beta males without any reciprocal obligations to them. Despite all the new freedoms available to women that freed them from their traditional responsibilities, men were still expected to adhere to *their* traditional responsibilities.

Marriage 2.0 : From the West to the Middle East to Asia, marriage is considered a mandatory bedrock of any functioning society. If marriage is such a crucial ingredient of societal health, then the West is barreling ahead on a suicidal path.

We earlier discussed why marriage was created, but equally important were the factors that sustained the institution and kept it true to its objectives. The reasons that marriage 'worked' not too long ago were :

- 1) People married at the age of 20, and often died by the age of 50. People were virgins at marriage, and women spent their 20s tending to 3 or more children. Her peak years were contained within marriage. **This is an entirely different psychological foundation than the present urban norm of a woman marrying at the age of 34 after her peak years are in the past and she has had 10 or more prior sexual relationships.** Some such women have already undergone what can best be described as a fatocalypse.
- 2) It was entirely normal for 10-20% of young men to die or be crippled on the battlefield, or in occupational accidents. Hence, there were always significantly more women than able-bodied men in the 20-40 age group, ensuring that not all women could marry. Widows were common and visible, and vulnerable to poverty and crime. For these reasons, women who were married to able-bodied men knew how fortunate they were relative to other women who had to resort to tedious jobs just to survive, and treated their marriage with corresponding respect.
- 3) Prior to the invention of contraception, female promiscuity carried the huge risk of pregnancy, and the resultant poverty and low social status. It was virtually impossible for any women to have more than 2-3 sexual partners in her lifetime without being a prostitute, itself an occupation of the lowest social status.
- 4) Divorce carried both social stigma and financial losses for a woman. Her prospects for remarriage were slim. Religious institutions, extended clans, and broader societal forces were pressures to keep a woman committed to her marriage, and the notion of leaving simply out of boredom was out of the question.

Today, however, all of these factors have been removed. This is partly the result of good forces (economic progress and technology invented by beta men), but partly due to artificial schemes that are extremely damaging to society.

For one thing, the wedding itself has gone from a solemn event attended only by close family and friends, to an extravaganza of conspicuous consumption for the enjoyment of women but financed by the hapless man. The wedding ring itself used to be a family heirloom passed down over generations, but now, the bride thumbs through a catalog that shows her rings that the man is expected to spend two months of his salary to buy. **This presumption that somehow the woman is to be indulged for entering marriage** is a complete reversal of centuries-old traditions grounded in biological realities (and evidence of how American men have become weak pushovers). In some Eastern cultures, for example, it is normal even today for either the bride's father to pay for the wedding, or for the bride's family to give custody of all wedding jewelry to the groom's family. The reason for this was so that the groom's family effectively had a 'security bond' against irresponsible behavior on the part of the bride, such as her leaving the man at the (Eastern equivalent of the) altar, or fleeing the marital home at the first sign of distress (also a common female psychological response). For those wondering why Eastern culture has such restrictions on women and not men, restrictions on men were tried in some communities, and those communities quickly vanished and were forgotten. There is no avoiding the reality that marriage has to be made attractive to *men* for the surrounding civilization to survive. Abuse and blackmail of women certainly occurred in some instances, but on balance, these customs existed through centuries of observing the realities of human behavior. Persian, Indian, and Chinese civilization has survived for over 5000 years and every challenge imaginable through enforcement of these customs, and, until recently, the Christian world also had comparable mechanisms to steer individual behavior away from

destructive manifestations. However, if the wedding has mutated into a carnival of bridezilla narcissism, the mechanics of divorce are far more disastrous.

In an 'at will' employment arrangement between a corporation and an employee, either party can terminate the contract at any time. However, instead of a few weeks of severance, imagine what would happen if the employer was legally required to pay the employee half of his or her paycheck for 20 additional years, irrespective of anything the employee did or did not do, under penalty of imprisonment for the CEO. Suppose, additionally, that it is culturally encouraged for an employee to do this whenever even minor dissatisfaction arises. Would businesses be able to operate? Would anyone want to be a CEO? Would businesses even form, and thus would any wealth be created, given the risks associated with hiring an employee? Keep these questions in mind as you read further.

So why are **70-90% of divorces initiated by women**? Women have always been hypergamous, and most were married to beta men that they felt no attraction towards, so what has changed to cause an increase in divorce rates?

Divorce lawyers, like any other professional group, will seek conditions that are good for business. What makes attorneys different from, say, engineers or salespeople, is that a) they know precisely *how* to lobby for changes to the legal system, bypassing voters and the US constitution, that guarantees more revenue for them, and b) what benefits them is directly harmful to the fabric of society in general, and to children in particular. When they collude with **rage-filled 'feminists' who openly say that 90% of the male gender should be exterminated**, the outcome is catastrophic.

The concept of 'no fault' divorce by itself may not be unfair. The concepts of asset division and alimony may also be fair in the event of serious wrongdoing by the husband. However, the combination of no-fault divorce *plus* asset division/alimony is incredibly unfair and prone to extortionary abuse. The notion that *she* can choose to leave the marriage, yet *he* is nonetheless required to pay *her* for years after that even if he did not want to destroy the union, is an injustice that should not occur in any advanced democracy. Indeed, the man has to pay even if the woman has an extramarital affair, possibly even being ordered to pay her psychiatric fees. Bogus claims by 'feminists' that women suffer under divorce are designed to obscure the fact that *she* is the one who filed for divorce. Defenders of alimony insist that a woman seeking a divorce should not see a drop in living standards, but it is somehow acceptable for the husband to see a drop even if he did not want a divorce. I would go further and declare that any belief that women deserve alimony on a no-fault basis in this day age is utterly contradictory to the belief that women are equals of men. How can women both deserve alimony while also claiming equality? In rare cases, high-earning women have had to pay alimony to ex-husbands, **but that is only 4% of the time, vs. the man paying 96% of the time**. But it gets worse; much worse, in fact.

Even if the woman chooses to leave on account of 'boredom', she is still given default custody of the children, which exposes the total hypocrisy of feminist claims that men and women should be treated equally. Furthermore, **the man is required to pay 'child support' which is assessed at levels much higher than the direct costs of child care**, with the woman facing no burden to prove the funds were spent on the child, and cannot be specified by any pre-nuptial agreement. The rationale is that 'the child should not see a drop in living standards due to divorce', but since the mother has custody of the child, this is a stealthy way in which feminists have ensured financial maintenance of the mother as well. So the man loses his children *and* most of his income even if he did not want divorce. But even that is not the worst-case scenario.

The **Bradley Amendment**, devised by Senator Bill Bradley in 1986, ruthlessly pursues men for the already high 'child support' percentages, and seizes their passports and imprisons them without due process for falling behind in payments, even if on account of job loss during a recession. Under a bogus 'deadbeat dads' media campaign, 'feminists' were able to obscure the fact that women were the ones ending their marriages and with them the benefit that children receive from a two-parent upbringing, and further demanding unusually high spousal maintenance, much of which does not even go to the child, from a dutiful ex-husband who did not want a divorce, under penalty of imprisonment. So the legal process uses children as pawns through which to extract an expanded alimony stream for the mother. The phony tactic of insisting that 'it is for the children' is used to shut down all questions about the

use of children as pawns in the extortion process, while avoiding scrutiny of the fact that the parent who is choosing divorce is clearly placing the long-term well-being of the children at a very low priority.

So as it stands today, there are large numbers of middle-class men who were upstanding citizens, who were subjected to divorce against their will, had their children taken from them, pay alimony masked as child support that is so high that many of them have to live out of their cars or with their relatives, and after job loss from economic conditions, are imprisoned simply for running out of money. If 10-30% of American men are under conditions where 70% or more of their income is taken from them under threat of prison, these men have no incentive to start new businesses or invent new technologies or processes. **Having 10-30% of men disincentivized this way cannot be good for the economy, and is definitely a contributor to current economic malaise, not to mention a 21st-century version of slavery.** Sometimes, the children are not even biologically his.

This one-page site has more links about the brutal tyranny that a man can be subjected to once he enters the legal contract of marriage, and even more so after he has children. What was once the bedrock of society, and a solemn tradition that benefited both men and women equally, has quietly mutated under the evil tinkering of feminists, divorce lawyers, and leftists, into a shockingly unequal arrangement, where the man is officially a second-class citizen who is subjected to a myriad of sadistic risks. As a result, the word 'marriage' should not even be used, given the totality of changes that have made the arrangement all but unrecognizable compared to its intended ideals. Suicide rates of men undergoing divorce run as high as 20%, and all of us know a man who either committed suicide, or admits seriously considering it during the dehumanization he faced even though *he* wanted to preserve the union. Needless to say, this is a violation of the US Constitution on many levels, and is incompatible with the values of any supposedly advanced democracy that prides itself on freedom and liberty. **There is effectively a tyrannical leftist shadow state operating within US borders but entirely outside the US constitution, which can subject a man to horrors more worthy of North Korea than the US, even if he did not want out of the marriage, did not want to be separated from his children, and did not want to lose his job.** Any unsuspecting man can be sucked into this shadow state.

Anyone who believes that two-parent families are important to the continuance of an advanced civilization, should focus on the explosive growth in revenue earned by divorce lawyers, court supervisors, and 'feminist' organizations over the past quarter-century. If Western society is to survive, these revenues should be chopped down to a tenth of what they presently are, which is what they would be if the elements that violate the US Constitution were repealed.

Marriage is no longer a gateway to female 'companionship', as we shall discuss later. For this reason, I cannot recommend 'marriage', in its modern state, to any young man living in the US, UK, Canada, or Australia. There are just too many things outside of his control that can catastrophically ruin his finances, emotions, and quality of life.

At a minimum, he should make sure that having children is the most important goal of his life. If not, then he has insufficient reason to enter this contract. If this goal is affirmed, then he should conduct research by speaking to a few divorced men about the laws and mistreatment they were subjected to, and attend a few divorce court hearings at the local courthouse. After gaining this information, if he still wants to take the risk, he should only marry if he can meet the following three conditions, none of which can substitute either of the other two :

- 1) The woman earns the same as, or more than, he does.
- 2) He has a properly done pre-nuptial arrangement with lawyers on each side (even though a pre-nup will not affect the worst aspect of divorce law - 'child support' as a cloak for stealth alimony and possible imprisonment).
- 3) **He is deeply competent in seduction practices (Game), and can manage his relationship with his wife effortlessly.** Even this is a considerable workload, however. More on this later.

There are still substantial risks, but at least they are somewhat reduced under these conditions. If marriage is a very important goal for a young man, he should seriously consider expatriation to a developing country, where he

ironically may have a higher living standard than in the US after adjusting for divorce risk.

So, to review, the differences between Marriage 1.0 and Marriage 2.0 are :

- a) No fault asset division and alimony, where the abandoned spouse has to pay if he earns more, even if he did not want a divorce, and even if he is a victim of abuse, cuckolding, or adultery. There are *rare* instances of high-earning women getting caught in this trap as well.
- b) Women marrying after having 5 or more sexual partners, compared to just 0-1 previously. This makes it harder for the woman to form a pair bond with her husband.
- c) Women marrying at an age when very few years of their peak beauty are remaining, compared to a decade or more remaining under Marriage 1.0.
- d) Child custody is almost never granted to the man, so he loses his children on a 'no fault' basis.

Traditional cultures marketed marriage with such punctilious alacrity that most people today dare not even question whether the traditional truths still apply. Hence, hostility often ensues from a mere attempt to even broach the topic of whether marriage is still the same concept as it once was. Everyone from women to **sadistic social conservatives** to a young man's own parents will pressure and shame him into marriage for reasons they cannot even articulate, and condemn his request for a pre-nup, without having any interest in even learning about the horrendously unequal and carefully concealed laws he would be subjected to in the event that his wife divorces him through no reasons he can discern. But some men with an eye on self-preservation are figuring this out, and are avoiding marriage. By many accounts, **22% of men have decided to avoid marriage**. So what happens to a society that makes it unattractive for even just 20% of men to marry?

Women are far more interested in marriage than men. Simple logic of supply and demand tells us that the institution of monogamous marriage requires at least 80% male participation in order to be viable. When male participation drops below 80%, *all* women are in serious trouble, since there are now 100 women competing for every 80 men, compounded with the reality that women age out of fertility much quicker than men. This creates great stress among the single female population. In the past, the steady hand of a young woman's mother and grandmother knew that her beauty was temporary, and that the most seductive man was not the best husband, and they made sure that the girl was married off to a boy with long-term durability. Now that this guidance has been removed from the lives of young women, thanks to 'feminism', these women are proving to be poor pilots of their mating lives who pursue alpha males until the age of 34-36 when her desirability drops precipitously and not even beta males she used to reject are interested in her. This stunning plunge in her prospects with men is known as the **Wile E. Coyote** moment, and women of yesteryear had many safety nets that protected them from this fate. The 'feminist' media's attempt to normalize 'cougarhood' is evidence of gasping desperation to package failure as a desirable outcome, which will never become mainstream due to sheer biological realities. Women often protest that a high number of sexual partners should not be counted as a negative on them, as the same is not a negative for men, but this is merely a **manifestation of solipism**. A complex sexual past works against women even if the same works in favor of men, due to the natural sexual attraction triggers of each gender. A wise man once said, "A key that can open many locks is a valuable key, but a lock that can be opened by many keys is a useless lock."

The big irony is that 'feminism', rather than improving the lives of women, has stripped away the safety nets of mother/grandmother guidance that would have shielded her from ever having to face her Wile E. Coyote moment. 'Feminism' has thus put the average woman at risk in yet another area.

Game (Learned Attraction and Seduction) : The Four Sirens and the legal changes feminists have instituted to obstruct beta men have created a climate where men have invented techniques and strategies to adapt to the more challenging marketplace, only to exceed their aspirations. This is a disruptive technology in its own right. All of us know a man who is neither handsome nor wealthy, but consistently has amazing success with women. He seems to have natural instincts regarding women that to the layperson may be indistinguishable from magic. So how does he do it?

Detractors with a vested interest in the present status quo are eager to misrepresent what 'Game' is, and the presence of many snake-oil salesmen in the field does not help, but as a definition :

The traits that make a man attractive to women are learnable skills, that improve with practice. Once a man learns these skills, he is indistinguishable from a man who had natural talents in this area. Whether a man then chooses to use these skills to secure one solid relationship or multiple brief ones, is entirely up to him.

The subject is too vast for any description over here to do it full justice, but in a nutshell, the Internet age enabled communities of men to share the various bits of knowledge they had field tested and refined (e.g. one man being an expert at meeting women during the daytime, another being an expert at step-by-step sexual escalation, yet another being a master of creating lasting love, etc.). The collective knowledge grew and evolved, and an entire industry to teach the various schools of 'Game' emerged. Men who comprehended the concepts (a minority) and those who could undertake the total reconstitution of their personalities and avalanche of rejections as part of the learning curve (a still smaller minority) stood to reap tremendous benefits from becoming more attractive than the vast majority of unaware men. While the 'pick-up artist' (PUA) implementation is the most media-covered, **the principles are equally valuable for men in monogamous long-term relationships (LTRs)**. See **Charlotte Allen's** cover story for **The Weekly Standard**, devoted to 'Game'.



Among **the most valuable learnings from the body of knowledge** is the contrarian revelation that what women say a man should do is often quite the antithesis of what would actually bring him success. For example, being a needy, supplicative, eager-to-please man is precisely the opposite behavior that a man should employ, where being dominant, teasing, amused, yet assertive is the optimal persona. An equally valuable lesson is to realize when not to take a woman's words at face value. Many statements from her are 'tests' to see if the man can remain congruent in his 'alpha' personality, where the woman is actually hoping the man does *not* eagerly comply to her wishes. Similarly, the 'feminist' Pavlovian reaction to call any non-compliant man a 'misogynist' should also not be taken as though a rational adult assigned the label after fair consideration. Such shaming language is only meant to deflect scrutiny and accountability from the woman uttering it, and should be given no more importance than a 10-year-old throwing a tantrum to avoid responsibility or accountability. Far too many men actually take these slurs seriously, to the detriment of male rights and dignity.

Success in internalizing the **core fundamentals of Game** requires an outside-the-box thinker solidly **in the very top of Maslow's Hierarchy**, and in my experience, 80% of men and 99.9% of women are simply incapable of comprehending why the skills of Game are valuable and effective. Many women, and **even a few pathetic men, condemn Game, without even gaining a minimal comprehension for what it truly is** (which I have highlighted in red above), and how it benefits both men and women. Most of what they think they know about Game involves strawmen, a lack of basic research, and their own sheer insecurity.

For anyone seeking advice on learning the material, there is one rule you must never break. I believe it is of paramount importance that the knowledge be used ethically, and with the objective of creating mutually satisfying relationships with women. It is not moral to mistreat women, even if they have done the same to countless men. We, as men, have to take the high road even if women are not, and this is my firm belief. Nice guys can finish first if they have Game.

'Feminism' as Unrestrained Misandry and Projection : The golden rule of human interactions is to judge a person, or a group, by their actions rather than their words. The actions of 'feminists' reveal their ideology to be one that seeks to secure equality for women in the few areas where they lag, while distracting observers from the vast array of areas where women are in a more favorable position relative to men (the judicial system, hiring and admissions quotas, media portrayals, social settings, etc.). They will concoct any number of bogus statistics to maintain an increasingly ridiculous narrative of female oppression.

Feminists once had noble goals of securing voting rights, achieving educational parity, and opening employment channels for women. But once these goals were met and even exceeded, the activists did not want to lose relevance. Now, they tirelessly and ruthlessly lobby for changes in legislation that are blatantly discriminatory against men (not to mention unconstitutional and downright cruel). Not satisfied with that, they continue to lobby for social programs designed to devalue the roles of husbands and fathers, replacing them with taxpayer-funded handouts.

As it is profitable to claim victimhood in this age, a good indicator is whether any condemnation by the supposedly oppressed of their oppressor could be similarly uttered if the positions were reversed. We see an immense double standard regarding what women and men can say about each other in America today. This reveals one of the darkest depths of the human mind - when a group is utterly convinced that they are the 'victims' of another group, they can rationalize any level of evil against their perceived oppressors.

Go to any major 'feminist' website, such as feministing.com or Jezebel.com, and ask polite questions about the fairness of divorce laws, or the **injustice of innocent men being jailed on false accusations of rape without due process**. You will quickly be called a 'misogynist' and banned from commenting. The same is not true for **any major men's site**, where even heated arguments and blatant misandry are tolerated in the spirit of free speech and human dignity. When is the last time a doctrinaire 'feminist' actually had the courage to debate a fair woman like Camille Paglia, Tammy Bruce, or Christina Hoff Somers on television?

Ever-tightening groupthink that enforces an ever-escalating narrative of victimhood ensures that projection becomes the normal mode of misandrist thought. The word 'misogynist' has expanded to such an extreme that it is the Pavlovian response to anything a 'feminist' *feels* bad about, but cannot articulate in an adult-like manner. This reveals the projected gender bigotry of the 'feminist' in question, which in her case is misandry. For example, **an older man dating women 10 years younger than him is also referred to as a 'misogynist' by the older bitterati**. Not an *ageist*, mind you, but a *misogynist*. A man who refuses to find obese women attractive is also a 'misogynist', as are gay men who do not spend money on women. The male non-compliance labeled as 'misogyny' thus becomes a reaction to many years of unopposed misandry heaped on him first, when he initially harbored no such sentiments. Kick a friendly dog enough times, and you get a nasty dog.

There are laws such as the Violence Against Women Act (VAWA), **that blatantly declares that violence against women is far worse than violence against men**. VAWA is very different from ordinary assault laws, because under VAWA, a man can be removed from his home at gunpoint if the woman makes a single phonecall. No due process is permitted, and the man's Constitutional rights are jettisoned. At the same time, **half of all domestic violence is by the woman against the man**. Tiger Woods' wife beat him with a blunt weapon and scratched his face, only **to be applauded by 'feminists' in a 'you go girl' manner**. Projection can normalize barbarism.

Rape legislation has also bypassed the US Constitution, leaving a man guilty until he proves himself innocent, while the accusing woman faces no penalty for falsely sending a man to prison for 15 years, where he himself will get raped. The Duke Lacrosse case was a prominent example of such abuse, but hundreds of others occur in America each year. The laws have been changed so that a victim has 1 month to 'decide' if she has been raped, and such flexibility predicatably leads to instances of a woman reporting rape just so that she does not have to tell her husband that she cheated on him (until it becomes profitable to divorce him). **40-50% of all rape accusations are false**, but 'feminists' would rather jail scores of innocent men than let one guilty man get away, **which is the exact opposite of what US Constitutional jurisprudence requires**.

But, unimaginably, it gets even worse. Polls of men have shown that there is one thing men fear even more than being raped themselves, and that is being cuckolded. Men see cuckolding as the ultimate violation and betrayal, yet there is an entire movement among 'feminists' to enshrine a woman's right to commit adultery and use the resources of her husband to dupe him into thinking the child is his. These misandrists even want to outlaw the right of a man to test the paternity of a child.

So, to review, if a woman has second thoughts about a tryst a few days later, she can, without penalty, ruin a man financially and send him to prison for 15 years. 'Feminists' consider this acceptable. At the same time, even though men consider being cuckolded a worse fate than being raped, 'feminists' want to make this easier for a woman to do, by preventing paternity testing. They already have rigged laws so that the man, upon 'no fault' divorce, has to pay alimony, to a woman who cuckolded him.

This is pure evil, ranking right up there with the worst tyrannies of the last century. Modern misandry masking itself as 'feminism' is, without equal, the most hypocritical ideology in the world today. The laws of a society are the DNA of that society. Once the laws are tainted, the DNA is effectively corrupted, and mutations to the society soon follow. Men have been killed due to 'feminism'. Children and fathers have been forcibly separated for financial gain via 'feminism'. Slavery has returned to the West via 'feminism'. With all these misandric laws, one can fairly say that misandry is the new Jim Crow.

Shaming Language and Projection as a Substitute for Rational Debate : As discussed previously, any legitimate and polite questions about the fairness of anti-male realities in the legal system and media are quickly met with Pavlovian retorts of 'misogynist' and 'loser'. Let us deconstruct these oft-used examples of shaming language, and why misandrists are so afraid of legitimate debate.

Contrary to their endless charges of 'misogyny' (a word that many 'feminists' still manage to misspell), in reality, most men instinctively treat women with chivalry and enshrine them on exalted pedestals. Every day, we see men willing to defend women or do favors for them. There is infinitely more chivalry than misogyny exhibited by the male population. On the other hand, we routinely see anti-male statements uttered by 'feminists', and a presumption that all men are monsters guilty of crimes committed by a small number of people of the same gender. When well-known 'feminists' openly state that 90% of the male population should be exterminated, the unsupported accusation of 'misogyny' is a very pure manifestation of their own misandric projection.

On the second charge of being a 'loser who cannot get laid', any observation of the real world quickly makes it obvious that men who have had little experience with women are the ones placing women on pedestals, while those men who have had substantial sexual experience with women are not. Having sex with a large number of women does not increase respect for women, which is the exact opposite of the claim that 'feminists' make. Again, this charge of 'loserdom' is merely the psychosexual frustration of 'feminists' projected outwards, who express surprise that unrelenting hatred by them towards men is not magically metabolized into love for these particular 'feminists'.

That misandrists are so unchallenged is the reason that they have had no reason to expand their arsenal of venom beyond these two types of projection. Despite my explanation of this predictable Pavlovian response, the comments section will feature misandrists use these same two slurs nonetheless, proving the very point that they seek to shout down, and the very exposure they seek to avoid. My pre-emption will not deter them from revealing their limitations by indulging in it anyway. They simply cannot help themselves, and are far from being capable of discussing actual points of disagreement in a rational manner.

Men, of course, have to be savvy about the real reason their debate skills are limited to these two paths of shaming language, and not be deterred. Once again, remember that this should be taken no more seriously than if uttered by a 10-year-old, and there is no reason to let a 'feminist' get away with anything you would not let a man get away with. They wanted equality, didn't they?

'Feminism' as Genuine Misogyny : The greatest real misogyny, of course, has been unwittingly done by the 'feminists' themselves. By encouraging false rape claims, they devalue the credibility of all claims, and genuine

victims will suffer. By incentivizing the dehumanization of their ex-husbands and the use of children as pawns, they set bad examples for children, and cause children to resent their mothers when they mature. By making baseless accusations of 'misogyny' without sufficient cause, they cause resentment among formerly friendly men where there previously was none. By trying to excuse cuckolding and female domestic violence, they invite formerly docile men to lash out in desperation.

One glaring example of misandry backfiring is in the destruction of marriage and corresponding push of the 'Sex in the City/cougar' fantasy. Monogamous marriage not only masked the gap between 'alpha' and 'beta' men, but also masked the gap between attractiveness of women before and after their Wile E. Coyote moment. By seducing women with the myth that a promiscuous single life after the age of 35 is a worthy goal, many women in their late 30s are left to find that they command far less male attention than women just a decade younger than them. 'Feminism' sold them a moral code entirely unsuited to their physical and mental realities, causing great sadness to these women.

But most importantly, 'feminists' devalued the traditional areas of female expertise (raising the next generation of citizens), while attaching value only to areas of male expertise (the boardroom, the military, sexual promiscuity) and told women to go duplicate male results under the premise that this was inherently better than traditional female functions. Telling women that emulating their mothers and grandmothers is less valuable than mimicking men sounds quite misogynistic to me, and unsurprisingly, despite all these 'freedoms', **women are more unhappy than ever** after being inflicted with such misogyny.

So how did the state of affairs manage to get so bad? Surely 'feminists' are not so powerful?

Social Conservatives, White Knights, and Girlie-Men : It would be inaccurate to deduce that misandrists were capable of creating this state of affairs on their own, despite their vigor and skill in sidestepping both the US Constitution and voter scrutiny. Equally culpable are men who ignorantly believe that acting as obsequious yes-men to 'feminists' by turning against other men in the hope that their posturing will earn them residual scraps of female affection.

Chivalry has existed in most human cultures for many centuries, and is seen in literature from all major civilizations. Chivalry greatly increased a man's prospects of marriage, but the reasons for this have been forgotten. Prior to the modern era, securing a young woman's hand in marriage usually involved going through her *parents*. The approval of the girl's father was a non-negotiable channel in the process. If a young man could show the girl's parents that he would place her on a pedestal, they could be convinced to sanction the union. The girl herself was not the primary audience of the chivalry, as the sexual attraction of the girl herself was rarely aroused by chivalry, as the principles of Game have shown.

Hence, many men are still stuck in the obsolete, inobservant, and self-loathing notion that chivalry and excess servility are the pathways to sex today, despite the modern reality that a woman's sexual decisions are no longer controlled by her parents, and are often casual rather than locked in matrimony. **Whether such men are religious and called 'social conservatives', or effete leftists and called 'girlie men', they are effectively the same**, and the term 'White Knights' can apply to the entire group. **Their form of chivalry when exposed to 'feminist' histrionics results in these men harming other men at the behest of women who will never be attracted to them.** This is why we see peculiar agreement between supposedly opposed 'social conservatives' and 'feminists' whenever the craving to punish men arises. A distressingly high number of men actually support the imprisonment of innocent men for false rape accusations or job loss causing 'child support' arrears merely because these 'men' don't want to risk female disapproval, incorrectly assuming that fanatically vocal 'feminists' represent the official opinion of all women. **These men are the biggest suckers of all**, as their pig-headed denial of the effectiveness of Game will prevent them from deducing that excess agreeability and willingness to do favors for the objects of their lust are exactly the opposite of what makes women sexually attracted to men. No woman feels attraction for a needy man.

For this reason, after lunatic 'feminists', these pedestalizing White Knights are the next most responsible party for the misandry in Western society today. The average woman is not obsessively plotting new schemes to denigrate

and swindle men, she merely wants to side with whoever is winning (which presently is the side of misandry). But pedestalizing men actually carry out many dirty deeds against other men in the hopes of receiving a pat on the head from 'feminists'. Hence, the hierarchy of misandric zeal is thus :

Strident 'feminist' > pedestalizer/white knight > average woman.

For reasons described earlier, even a declaration that many men are bigger contributors to misandry than the average woman will not deter 'feminists' from their Pavlovian tendency to call articles such as this one 'misogynist'.

Lastly, the religious 'social conservatives' who continue their empty sermonizing about the 'sanctity of marriage' while doing absolutely nothing about the divorce-incentivizing turn that the laws have taken, have been exposed for their pseudo-moral posturing and willful blindness. What they claim to be of utmost importance to them has been destroyed right under their noses, and they still are too dimwitted to comprehend why. No other interest group in America has been such a total failure at their own stated mission. To be duped into believing that a side-issue like 'gay marriage' is a mortal threat to traditional marriage, yet miss the legal changes that correlate to a rise in divorce rates by creating incentives for divorce (divorce being what destroys marriage, rather than a tiny number of gays), is about as egregious an oversight as an astronomer failing to be aware of the existence of the Moon. Aren't conservatives the people who are supposed to grasp that incentives drive behavior? An article worthy of being written by The Onion could conceivably be titled 'Social conservatives carefully seek to maintain perfect 100% record of failure in advancing their agenda'.

Why There is No Men's Rights Movement : At this point, readers may be wondering "If things are this bad, why don't we hear anything about it?". Indeed, this is a valid question, and the answer lies within the fundamentals of male psychology. Most beta men would rather die than be called a 'loser' by women (alpha men, of course, know better than to take this at face value). White Knights also join in the chorus of shaming other men since they blunderously believe that this is a pathway to the satiation of their lust. So an unfairly ruined man is faced with the prospect of being shamed by women and a large cohort of men if he protests about the injustice, and this keeps him suffering in silence, leading to an early death. We have millions of fine young men willing to die on the battlefield to defend the values enshrined in the US Constitution, but we don't see protests of even 100 divorced men against the shamefully unconstitutional treatment they have received. **The destruction of the two-parent family by incentivizing immoral behavior in women is at least as much of a threat to American safety and prosperity as anything that ever could have come out of Afghanistan, Pakistan, Iran, or Saudi Arabia.** Men being too afraid to be the 'squeaky wheel' even when they have lost their children and their present and future assets is a major contributor to the prevailing status quo. Alpha men have no incentive beyond altruism to act as they benefit from the current climate, and thus my altruism will be limited to putting forth these ideas.

Any serious movement has to start a think tank or two to produce research reports, symposiums, and specific policy recommendations, and the few divorce lawyers who were compelled by their conscience to leave the dark side have to be recruited as experts. Subsequently, televised panel discussions have to be conducted at top medical, business, and graduate engineering schools (where young men about to embark on lucrative careers are approaching marriage age, but know nothing about the law), documentary films have to be produced, prominent victims like Mel Gibson, Paul McCartney, Hulk Hogan, and Tiger Woods have to be recruited as spokesmen, and visibly powerful protests outside of divorce courts have to be organized. In this age of Web 2.0/social media/viral tools, all this should be easy, particularly given how quickly leftist groups can assemble a comparable apparatus for even obscure causes.

Instead, all that exists are Men's Rights Authors (MRAs) that run a few websites and exchange information on their blogs. 'Something is better than nothing' is the most generous praise I could possibly extend to their efforts, and this article I am presenting here on The Futurist is probably the single biggest analysis of this issue to date, even though this is not even a site devoted to the subject and I am not the primary author of this site. Hence, there will be no real Men's Rights Movement in the near future. The misandry bubble will instead be punctured through the sum of millions of individual market forces.

The Faultline of Civilization : After examining all the flaws in modern societies, and the laws that exacerbate

them, it becomes apparent that there are two realms of legal/judicial thought that stand alone in determining whether our civilization is going to be ever-improving or merely cyclical. These two legal areas are a) the treatment of paternity rights, and b) the treatment of due process in rape accusations. The human brain is wired to value the well-being of women far higher than that of men (for reasons that were once valid, but no longer are today), which is why extending due process to a man falsely accused of rape is not of particular interest to people who otherwise value due process. Similarly, there is little resistance to 'feminist' laws that have stripped away all types of paternity rights from fathers. The father is not seen as valuable nor as worthy of rights, as we have seen above.

These two areas of law are precisely where our society will decide if it ascends or declines. All other political sideshows, like immigration, race relations, and even terrorism are simply not as important as none of those can destroy an *entire* society the way these laws can.

The Economic Thesis

Ceilings and Floors of Glass : Misandrists shriek about a supposed 'glass ceiling' of pervasive sexism that explains why 50% of the CEOs of major corporations are not women. What is never mentioned is the equally valid 'glass floor', where we see that 90% of imprisonments, suicides, and crippling occupational injuries are of men. If these outcomes are the results of the actions or choices of men who suffer from them, then is that not the same reason that determines who rises above the 'glass ceiling'? The inability of misandrists to address these realities in good faith tells us something (but not everything) about the irrational sense of entitlement they have.

One of the most dishonest myths of all is the claim that 'women earn just 75% of men for the same job'. Let me dispense of this myth, in the process of which we will see why it is profitable and seductive for them to broadcast this bogus belief.

It is true that women, on average, earn less per year than men do. It is also true that 22-year-olds earn less, on average, than 40-year-olds. Why is the latter not an example of age discrimination, while the former is seized upon as an example of gender discrimination?

If women truly did earn less for doing exactly the same job as a man, any non-sexist CEO could thrash his competition by hiring only women, thus saving 25% on employee salaries relative to his competitors. Are we to believe that every major CEO and Board of Directors is so sexist as to sacrifice billions of dollars of profit? **When the 'Director of Corporate Social Responsibility' of a nun congregation wrote to TJ Rodgers, CEO of Cypress Semiconductor, that his company should have more women in its Board of Directors, Rodgers replied with a letter explaining why the pursuit of profit could not accommodate such political correctness.** That a nun congregation pays a recession-proof salary to someone as a 'Director of Corporate Social Responsibility' is itself an example of a pampered existence, and I was unaware that convents were now advancing secular Marxist beliefs.



Furthermore, women entrepreneurs could hire other women and out-compete any male-dominated business if such a pay gap existed, but we do not see this happening in any country in the world. Market forces would correct such mispricings in female compensation, if they actually existed. But they do not, and those who claim that they do are not just advertising an extreme economic illiteracy, but are quite happy to make similarly illiterate women angry about an injustice that does not exist. I notice that women who actually are/were CEOs of publicly traded companies never claim that there is a conspiracy to underpay women relative to their output.

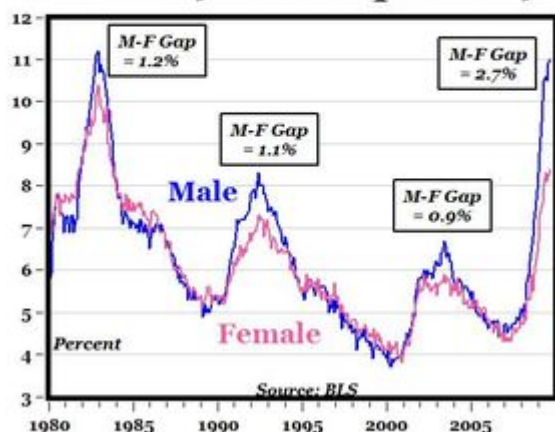
I am willing to pass laws to ensure that 50% of all Fortune 500 CEOs are women, if we also legally mandate that 50% of all imprisonments are of women, and 50% of the jobs that involve working with heavy machinery, being outdoors in inclement weather, inhaling toxic fumes, or apprehending dangerous criminals are also occupied by women. Fair is fair. Any takers?

The 'Mancession' and the 'Sheconomy' : I would be the first to be happy if the economic success of women were solely on the basis of pure merit. For many of them, it is. But far too much has been the result of not market forces or meritocracy, but political graft and ideology-driven corruption.

In the recent recession and ongoing jobless recovery, the male unemployment rate continues to be much higher than the female unemployment rate. If this was simply due to market forces, that would be fine. **However, 'feminist' groups have lobbied hard to ensure that government stimulus funds were steered to boost female employment at the expense of assistance for men.** The leftist Obama administration was more than eager to comply, and a forcible transfer of wealth was enacted, even though it may not have been the best deployment of money for the economy.

Maria Shriver, a woman who has the most fortunate of lives from the vast wealth earned first by her grandfather and then by her husband, recently published 'A Woman's Nation : The Shriver Report', consisting of gloating about how women were now outperforming men economically. **The entire research report is full of all the standard bogus feminist myths and flawed statistics, as thoroughly debunked here,** as well as the outright sexism of statements like 'women are better managers' (imagine a man saying the reverse). Furthermore, the report reveals the typical economic illiteracy (evidenced by, among other things, the ubiquitous 'women are underpaid' myth), as well as belief that businesses exist to act as vehicles of social engineering rather than to produce a profit.

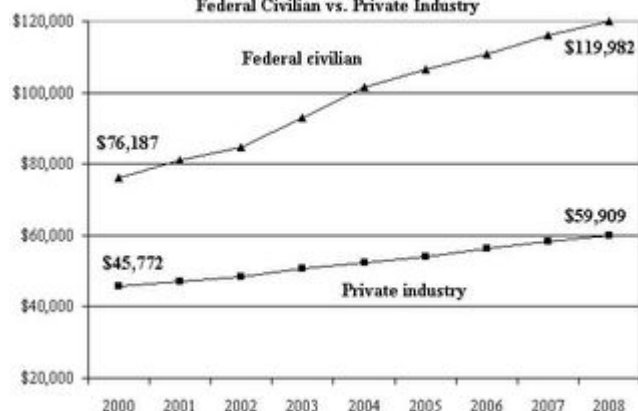
Unemployment Rate: Males vs. Females Jan. 1980 to Sept. 2009



All of this bogus research and organized anti-male lobbying has been successful. As of today, the male unemployment rate is worse than the female unemployment rate by an unprecedented chasm. The 'mancession' continues as the US transitions to a 'sheconomy', and among the millions of unemployed men, some owe prohibitive levels of 'child support' despite not being the ones wanting to deprive their children of a two-parent household, landing in prison for lack of funds. Furthermore, I emphasize again that having 10-30% of the US male workforce living under an effective 70% marginal tax rate will kill their incentives for inventing new technologies or starting new companies. It is petty to debate whether the top federal income tax bracket should be 35% or 39.6%, when a slice of the workforce is under a 70% tax on marginal income. Beyond the tyranny of this, it also costs a lot of taxpayer money to jail a growing pool of unemployed men. Clearly, moving more and more men out of a tax-generating capacity and into a tax-consuming capacity is certainly going to do two-fold damage to governmental budgets. The next time you hear someone say that 'the US has the largest prison population in the world', be sure to mention that many of these men merely lost their jobs, and were divorced against their will. The women, in the meantime, are having a blast.

The Government Bubble : While public sector vs. private sector workforce distribution is not highly correlated to gender, it is when the focus is on women earning over \$100,000 or more.

Figure 2. Average Compensation (Wages and Benefits),
Federal Civilian vs. Private Industry



This next chart from the Cato Institute shows that when total compensation (wages + benefits) are taken into account, the public sector has totally outstripped the private sector this decade. Has the productivity of the typical government employee risen so much more than that of the private worker, that the government employee is now paid twice as much? Are taxpayers receiving value for their money?

It goes further. The vast majority of social security taxes are paid by men, but are collected by women (due to women living 7 years longer than men on average). That is not troubling by any means, **but the fact that women**

consume two-thirds of all US healthcare, despite most of this \$2.5 Trillion annual expenditure being paid by men, is certainly worthy of debate. It may be 'natural' for women to require more healthcare, since they are the ones who give birth. But it was also 'natural' for men to finance this for only their wives, not for the broader community of women. The healthcare profession also employs an immense number of women, and not just in value-added roles such as nursing, but even in administrative and bureaucratic positions. In fact, virtually all government spending except for defense and infrastructure, from Medicare to Obamacare to welfare to public sector jobs for women to the expansion of the prison population, is either a net transfer of wealth from men to women, or a byproduct of the destruction of Marriage 1.0. In either case, 'feminism' is the culprit.



This Cato Institute chart of Federal Government spending (click to enlarge) shows how non-defense expenditures have steadily risen since 1960. The decline in defense spending, far from being a 'peace dividend' repatriated back to taxpayers, was used to fund more social programs. No one can seriously claim that the American public receives better non-defense governance in 2010 than in 1960 despite the higher price, and as discussed earlier, most of this increase is a direct or indirect result of 'feminism'. When state and local government wastage is added to this, it would appear that 20% of GDP is being spent just to make the government a substitute for the institution of Marriage, and yet still has not managed to be an effective replacement. Remember again that the earnings of men pays 70%-80% of all taxes.

The left has finally found a perfect Trojan Horse through which to expand a tyrannical state. 'Feminists' can lobby for a transfer of wealth from men to women and from private industry to the government, while knowing that calling any questioner a 'misogynist' will silence him far more effectively than their military fifth columnist and plain socialist brethren could ever silence their respective opponents. Conservatives are particularly vulnerable to such shaming language, and most conservatives will abandon their stated principles to endlessly support any and all socialism if it can be packaged as 'chivalry', the opposition to which makes one a 'misogynist'. However, there is reason to believe that tax collection in many parts of the US, such as in states like CA, NY, NJ, and MA, has reached saturation. As the optimal point has already been crossed, a rise in tax rates will cause a decrease, rather than an increase in revenue, and **the increase in Federal tax rates exactly one year from today on 1/1/2011 is likely to cause another recession**, which will not be so easily transferred to already-impooverished men the next time.

When men are severed from their children with no right to obstruct divorce, when they are excluded from the labor market not by market forces but rather by social engineering, and when they learn that the society they once believed in and in some cases joined the military to protect, has no respect for their aspirations, these men have no reason to sustain such a society.

The Contract Between the Sexes : A single man does not require much in order to survive. Most single men could eke out an adequate existence by working for two months out of the year. The reason that a man might work hard to earn much more than he needs for himself is to attract a wife amidst a competitive field, finance a home and a couple of children, and ultimately achieve status as a pillar of the community. Young men who exhibited high economic potential and favorable compatibility with the social fabric would impress a girl's parents effectively enough to win her hand in marriage. The man would proceed to work very hard, with the fruits of his labor going to the state, the employer, and the family. 80-90% of a man's output went to people other than himself, but he got a

family and high status in return, so he was happy with the arrangement.

The Four Sirens changed this, which enabled women to pursue alpha males despite the mathematical improbability of marrying one, while totally ignoring beta males. Beta males who were told to follow a responsible, productive life of conformity found that they were swindled.

Men who excelled under the societal rules of just two decades ago are often left totally betrayed by the rules of today, and results in them refusing to sustain a society heavily dependent on their productivity and ingenuity.

Women believed that they could free themselves from all their traditional obligations (**only to find, amusingly, that they are unhappier now than they were then**), while men would still fulfill all of their traditional obligations, particularly as bankrollers of women and protectors of women. Needless to say, despite the chivalry ground into men, eventually, they will feel that chivalry requires a level of gratitude that is not forthcoming.

To see what happens when the role of the husband and father is devalued, and the state steps in as a replacement, **look no further than the African American community. In Detroit, the average home price has fallen from \$98,000 as recently as 2003 to just \$14,000 today.** The auto industry moved jobs out of Detroit long before 2003, so the decline cannot be attributed to just industrial migration, and cities like Baltimore, Oakland, Cleveland, and Philadelphia are in scarcely better shape. For those who believe that this cannot happen in white communities, have a look at the white underclass in Britain. The lower half of the US white population is vulnerable to the same fate as the black community, and cities like Los Angeles are perilously close to 'Detroitification'.

Additionally, people seem to have forgotten that the physical safety of society, particularly of women, is entirely dependent on ratio of 'aggressor' men to 'protector' men staying below a certain critical threshold. As more men get shut out of the labor market, crime becomes an alternative. Even highly educated men who feel betrayed can lash out, and just about every shooting spree and every recent terrorist attempt in the West was by men who were educated and had good career prospects, but were unloved.

While professional men will certainly never resort to crime, what they could resort to is an unwillingness to aid a damsel in distress. More men will simply lose interest in being rescuers, and this includes policemen who may also feel mistreated by the prevailing misandry. Safety is like air - it is only noticed when it is gone. Women have a tremendous amount to lose by creating a lot of indifferent men.

Patriarchy works because it induces men and women to cooperate under their complementary strengths.

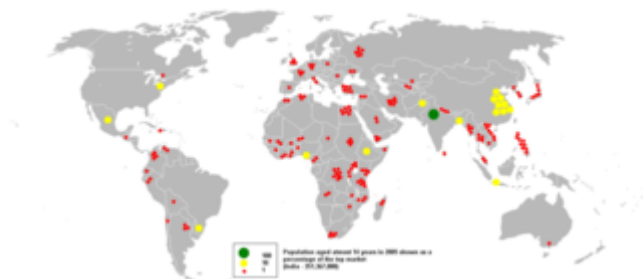
'Feminism' does not work, because it encourages immoral behavior in women, which eventually wears down even the durable chivalry of beta men, making both genders worse off. It is no secret that single motherhood is heavily subsidized, but it is less understood that single spinsterhood is also heavily subsidized through a variety of unsustainable and unreciprocated means. The default natural solution is for the misandric society to be outcompeted and displaced.

Population Displacement : So we have arrived at a society where 'feminists' feel that they are 'empowered', 'independent', and 'confident', despite being heavily dependent on taxes paid mostly by men, an unconstitutional shadow state that extracts alimony and 'child support' from men, an infrastructure maintained by men, technologies invented by men, and a level of safety that men agree to maintain. So exactly what has society received from this population of women who are the most privileged class of humans ever to have lived?

Three women of the same age	Urban Lefto-'Feminist'	Rural Conservative	Devout Muslim
Age 20	Single	Single	Single
Age 30	Single	Married, 1 child	Married, 3 children
Age 40	Single, past WEC moment	Married, 2 children	Married, 4 children
Age 60	0 grandchildren	4 grandchildren	12 grandchildren

Now, let me be clear; I believe a woman should get to decide how many children she bears, or even whether or not to have any children at all. However, a childless old woman should not then be able to extract resources from the children of other women. Fair is fair, and the obligation of working-age people to support the elderly should not be socialized in order to subsidize women who chose not to reproduce.

Let us take a hypothetical example of three 20-year-old single women, one who is an urban lefto-'feminist', one who is a rural conservative, and one who is a devout Muslim. The following table charts the parallel timelines of their lives as their ages progress in tandem, with realistic estimates of typical life events. When people talk about falling birth rates in the West, they often fail to account for the additional gap caused by having children at age 23 vs. at age 33. As the table shows, a 1:1:1 ratio of three young ladies takes only 40 years to yield a 12:4:0 ratio of grandchildren. Consider, also, that we are already 20 years into this 40-year process, so each of these women are 40 years old today.



So how do we estimate the value society will ultimately receive from organizing itself in a manner that young women could choose a life of bar-hopping, shopping for \$300 purses, and working as government bureaucrats to make the government a more complete husband substitute? If the sight of a pitiful 60-year-old Code Pink harpy lecturing 12 Muslim adolescents that 'gender is a social construct' seems amusing, then let us move on to the macro chart. [This world map](#)(click to enlarge) shows how many children under the age of 15 existed in the major countries of the world in 2005 (i.e. born between 1990 and 2005), in proportion to the country with the most children. Notably, Mexico and the US have the same number of children, while Pakistan and Bangladesh each have about as many as all of Western Europe. While developing countries are seeing their fertility rates converge to Western levels, the 1990-2005 births already seal certain realities. Needless to say, if we move time forward just 15 years, the proportions in this chart reflect what the proportions of adults aged 20-35 (the female reproductive years) will be per nation in the year 2025. Even the near future belongs to those who show up.

Lefto-'feminists' will be outbred and replaced very quickly, not by the conservatives that they hate, but by other cultures antithetical to 'feminism'. The state that lefto-'feminists' so admire will quickly turn on them once the state calculates that these women are neither producing new taxpayers nor new technologies, and will find a way to demote them from their present 'empowered' position of entitlement. If they thought having obligations to a husband was such an awful prospect, [wait until they have obligations to the husband-substitute state](#).

The Fabric of Humanity Will Tear

Humans like ourselves have been around for about 100,000 years, and earlier hominids similar to us for another 1-3 million years before that. For the first 99.99% of humanoid existence, the primary purpose of our species was the same as that of every other species that ever existed - to reproduce. Females are the scarcer reproductive resource, since the number of babies that can be produced does not fall even if most men die, but it does fall for each woman that dies (humans did not live much past age 40-45 in the past, as mentioned earlier). For this reason, the human brain continued the evolutionary hardwiring of our ancestors, placing female well-being at a premium while males remain expendable. Since funneling any and all resources to women closely correlated with the survival of children, both men and women evolved to see this status quo as normal. The Female Imperative (FI) was the human imperative.

As human society progressed, priorities adjusted. For one thing, advances in technology and prosperity ensured that child mortality fell from about 50% to very low levels, so 12 births were no longer needed to produce 6 children who reach adulthood. Secondly, as humans moved away from agriculture into a knowledge-based economy, the number of children desired fell, and almost all high and middle-income countries have birth rates lower than 2 as of today, with many women producing zero children. Thirdly, it has become evident that humans are now the first species to produce something more than just offspring; humans now produce technology. As a result, the former direct correlation between funneling resources to women and the survival of children, which was true for 99.99% of our existence, now no longer is.

Yet, our hardwired brains have not adapted to this very recent transformation, and perhaps cannot adapt. Women are programmed to extract resources endlessly, and most men are programmed to oblige. For this once-valid but now obsolete biological reason, society still unquestioningly funnels the vast majority of resources to women. But instead of reaching children, this money now finds its way into consumer products geared towards women, and a shadow state designed to transfer all costs and consequences away from women. Most people consider our existing society to be normal, but they have failed to observe how diverting money to women is now obsolete. In the 21st century, there is no reason for any resource distribution, if there must be one at all, to be distributed in any manner other than 50-50.

Go to any department store or mall. At least 90% of the products present there are ones no ordinary man would consider buying. Yet, they occupy valuable shelf space, which is evidence that those products do sell in volume.

Who buys them? Look around in any prosperous country, and we see products geared towards women, paid for by money that society diverted to women. From department store products, to the proliferation of take-out restaurants, to mortgage interest, to a court system rigged to subsidize female hypergamy, all represent the end product of resources funneled to women, for a function women have greatly scaled back. This is the greatest resource misallocation ever, and such malinvestment always results in a correction as the bubble pops.

This is not to suggest that we should go back to birth rates of 12, for that is neither desirable nor necessary. The bigger picture here is that a major aspect of the human psyche is quite obsolete, with men and women both culpable. When this situation corrects, it will be the most disruptive event humanity has ever faced. Some call this a variant of the 'Technological Singularity', which will happen many decades later than 2020, but even prominent thinkers steer clear of any mention of the obvious correction in gender-tilted resource flows that will occur.

The Four Horsemen of Male Emancipation

We earlier examined how the Four Sirens of Feminism unexpectedly combined and provided women with choices they never could have dreamed of before. Some women made positive contributions to society, but quite a few let misandry and unrestrained greed consume them, and have caused the disastrous situation we presently see.

Technology always causes disruption in the status quo, always creating new winners and losers with each wave. In centuries past, Gloria Steinem would be a governess and Mystery would be a court jester.

The title of this article is not the 'Misandry Crisis' or even 'The War on Misandry'. It is 'The Misandry Bubble', because the forces that will ensure the demise of the present mistreatment of men are already on the horizon. So allow me to introduce the Four Horsemen of Male Emancipation as a coalescence of many of the forces we have discussed, which will shred the present, unsustainable hierarchal order by 2020 :

1) Game : Learning the truth about how the female mind works is a precious and transcendent body of knowledge for any man. Whether he uses it to become a fully immersed pick-up artist, to create a soulmate bond in a lifelong monogamous marriage, or even to engage in only infrequent yet efficient trysts with women, a man is free from the crushing burdens that uninitiated beta men are capitulating under.

When a man learns that there is no reason for him to buy a \$50,000 car, \$20,000 ring, \$50,000 bridezilla festival, overpriced house contrary to any logical financial analysis, or a divorce lawyer to save him from ruin even though he was the victim of spousal abuse, there is no greater feeling of liberation and jubilation, equating to a windfall of \$2 Million for all objective and subjective purposes. When a man realizes that reducing his income by half will now have little detriment to his sexual prospects, he can downsize to an easier job with a shorter commute and lower stress. When a man learns that appeasing a woman is the exact opposite of what he should be doing during the process of romancing and seducing her, that entire humiliating gauntlet of rituals can be jettisoned.

The ecstasy of two or even three concurrent relationships with women of substantially above average beauty are quite attainable to a man who has scaled the summit, which further deprives the hapless betas (again, male attractiveness to women is zero-sum in a way that female attractiveness to men is not). Thus, while 80% of men have no intellectual capacity to grasp and master Game, if the number of solid practitioners even begins to approach 20%, multiple parasitic beasts, from female moochers to the tax-swilling state to the corrupt real-estate and divorce lawyer industries, can be effectively starved.

2) Adult Entertainment Technologies of 2020 : What of the 80% of men who cannot conceptualize or master the core skills of Game? Won't they be condemned to live a life of frustration, humiliation, and near-slavery as second class citizens? Thankfully, these poor souls will experience a satisfactory release through technology, just like women did through technologies such as contraceptive pills, washing machines, and vacuum cleaners.

For a number of reasons, Internet pornography is substantially more addictive to the male brain than the VHS cassette or 'Skinimax' content of the 1990s. When yet another generation of technology diffuses into the market, the implications will be profound enough to tear the current sexual market asunder.

This site has written in the past about how haptic, motion sensing, and graphical technologies would elevate video games to the premier form of entertainment by 2012. 3-D/holographic images with haptic interfaces and sufficient AI will make rudimentary 'virtual sex' a technology available to many men well before 2020, but by 2020 we will see this cross certain thresholds that lead to a dramatic market impact far greater than contraceptive pills and Internet pornography combined. A substantial portion of the male population will drift into addiction to virtual sex without even realizing it.

For those (mostly women) who claim that the VR sex of 2020 would not be a sufficient substitute for the real thing, that drawback is more than superseded by the inescapable fact that the virtual woman would be made to be a 10/10+ in appearance, while the real women that the typical beta male user has access to would be in the 4-7 range. Real 10 > VR 10 > Real 7, making irrelevant the claim that a virtual 10 is not as good as a real 10 (under 1% of all women), when the virtual 10 is really competing with the majority of women who are 7s and lower.

Women are unaware how vastly different the male reaction is to a 10 relative to a 7, let alone to women of even lower scores. As single men arrive home from work on Friday evening, they will simply default into their VR immersion, giving a whole new meaning to the concept of 'beta testing'. These sequestered men will be conspicuously absent from the bars and nightclubs that were the former venues of expenditure and frustration, causing many establishments to go out of business. The brains of these men will warp to the extent that they can no longer muster any libido for the majority of real women. This will cause a massive devaluation in the sexual market value of most women, resulting in 8s being treated like 5s, and 35-year-old women unable to attract the

interest of even 55-year-old men. The Wile E. Coyote moment for women will move a few years ahead, and the alphas with Game competence will find an even easier field of desperate women to enjoy.

Another technology making advancements in Japan is that of lifelike female robots. I do not believe that 'sexbots' will be practical or economical relative to software/gaming-derived solutions, simply because such a robot is not competitive with VR on cost, privacy, versatility, and upgradeability.

Some 'feminists' are not blind to the cataclysmic sexual devaluation that women will experience when such technologies reach the market, **and are already moving to seek bans**. Such bans will not be possible, of course, as VR sex technologies are inseparable from broader video game and home theater technologies. Their attempts to lobby for such bans will be instructive, however.

Another positive ramification of advanced adult entertainment technologies is that women will have to sharpen the sole remaining attribute which technology cannot substitute - the capacity to make a man feel loved. Modern women will be forced to reacquaint themselves with this ancient concept in order to generate a competitive advantage. This necessity could lead to a movement of pragmatic women conducting a wholesale repudiation of misandry masquerading as 'feminism' that has created this state of affairs, and thus will be the jolt that benefits both men and women.

3) Globalization : The Third Horseman is a vast subject that contains many subtopics. The common theme is that market forces across the world eventually find a way around legislative fences constructed in any one country :

a) Islam : Aside from the higher birthrates of Muslims living in the same Western cities that 'feminists' reside in, an Achilles heel of leftists in general and misandrists in particular is their unwillingness to confront other cultures that actually do place restrictions on women. In Britain, Islamic courts are now in operation, deciding cases through Sharia principles. **British divorce laws are even more misandric than US divorce laws, and so many British men, in desperation, are turning to Sharia courts in order to avoid the ruin that British law would inflict on them.** The Islamic courts are more than happy to accomodate these men, and 'feminists' dare not protest too loudly. By driving British men to Sharia courts, misandry is beautifully self-defeating. The irony is that the group that was our enemy in the crisis of the prior decade are now de-facto allies in the crisis of this decade. I do not say this simply because I am a Muslim myself.

b) Expatriation : While America continues to attract the greatest merit and volume of (legal) immigrants, almost every American man who relocates to Asia or Latin America gives a glowing testimonial about the quality of his new life. A man who leaves to a more male-friendly country and marries a local woman is effectively cutting off a total of three parasites in the US - the state that received his taxes, the potential wife who would take his livelihood, and the industries he is required to spend money on (wedding, diamond, real estate, divorce attorney). Furthermore, this action also shrinks the number of available men remaining in America. The misandrists who project their pathology outward by calling such men 'misogynists' are curiously troubled that these same men are leaving the US. Shouldn't 'feminists' be happy if 'misogynists' are leaving? We thus see yet another example of 'feminists' seeking to steal from men while not providing them any benefit in return.

The more unfair a place becomes, the more we see talented people go elsewhere. When word of US divorce laws becomes common in India and China, this might even deter some future taxpayers from immigrating to America, which is yet another reason the government is losing money to misandry.

c) Medical Tourism : The sum total of donor eggs + IVF + surrogacy costs \$150,000 or more in the US, but can be done in some countries for just \$20,000 at top-quality clinics that are building a strong track record. While most customers of foreign fertility clinics are couples, there have been quite a few single men opting to create their own biological babies this way. While this avenue is not for everyone, the ability to have a child for \$20,000 (and even two children in parallel with two different surrogates in a two-for-one bundle deal for \$35,000) now exists. The poor surrogate mother in India or the Philippines earns more than she could earn in

10 years in her prior vocation of construction or housecleaning. It is a win-win for everyone involved, except for the Western woman who was priced out of the market for marriage to this man.

Medical tourism also prices the US healthcare system out of contention for certain procedures, and the US healthcare system employs a large number of women, particularly in administrative and bureaucratic roles that pay them over twice what they could make in the private sector. Such women will experience what male manufacturing workers did a generation earlier, despite the increasingly expensive government bubble that has kept these women's inflated salaries safe for so long.

So as we can see, the forces of globalization are far bigger than those propping up the current lop-sided status quo.

4) Male Economic Disengagement and Resultant Tax-Base Erosion : Earlier passages have highlighted how even the most stridently egomaniacal 'feminist' is heavily dependent on male endeavors. I will repeat again that there will never, ever be a successful human society where men have no incentive to aspire to the full maximum of their productive and entrepreneurial capabilities.

The contract between the sexes has been broken in urban America (although is still in some effect in rural America). The 'progressive' income tax scale in the US was levied under the assumption that men who could earn 10 times more than they needed for themselves would always do so, for their families. A man with no such familial aspirations may choose an easier job at lower pay, costing the state more than he costs himself. Less tax revenue not just means fewer subsidies for single mothers and government jobs for women, but less money for law enforcement. Less tax revenue also means fewer police officers, and fewer court resources through which to imprison men. The 'feminist' hypergamous utopia is not self-financing, but is precariously dependent on every beta man working at his full capacity, without which the government bubble, inseparable from the misandry bubble, collapses. Misandry is thus mathematically impossible to finance for any extended period of time. A state with a small government is far more sustainable than a state seeking an ever-expanding government, which then cannot be financed, and descends into a mass of contradictions that is the exact opposite of what the statists intended. See the gangster capitalism that dominates contemporary Russia.

These Four Horsemen will all converge at the end of this decade to transfer the costs of misandry from men onto women, and on 1/1/2020, we will assess how the misandry bubble popped and the fallout that women are suffering under for having made the mistake of letting 'feminists' control their destiny (update : 1/1/2020 article [here](#)). Note that I did not list the emergence of any Men's Rights Movement as one of the Four Horsemen, as this is unlikely to happen for aforementioned reasons.

For those who dispute the Four Horsemen (I'd like to see their track record of predictions to compare against my own), women had their Four Sirens, and now the pendulum has to swing at the same amplitude in the other direction. Keep the Four Horsemen in mind throughout this decade, and remember what you read here on the first day of 2010.

Who Should Care?

As we leave a decade where the prime threat to US safety and prosperity was Islamic terrorism and enter a decade where the prime threat is misandry, anyone concerned with any of the following topics should take heed :

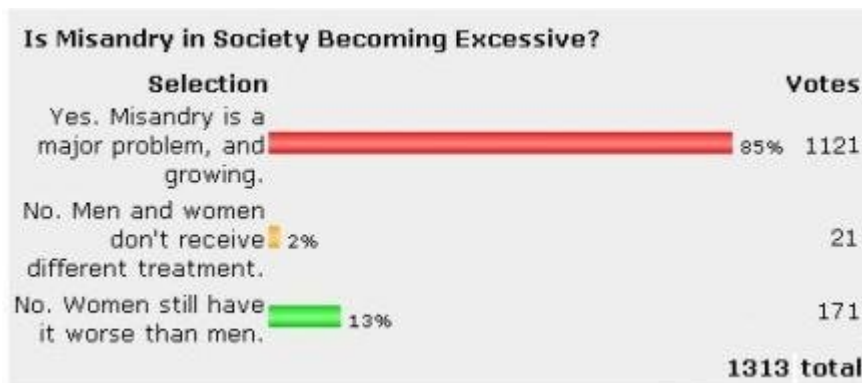
- Anyone with a son, brother, nephew, or mentee entering marriage, particularly without the partial protection of a pre-nuptial agreement. As described earlier, he can be ruined, separated from his children, and jailed in a manner few would suspect could happen in any advanced democracy. The suicide rate of divorced men is shockingly high.
- Anyone who agrees that a civilization where most adults are part of two-parent families will always outcompete and displace a civilization where a large portion of adults are not leading two-parent families.
- Anyone with minor grandchildren, nieces and nephews, or great-grandchildren. The divorce laws incentivize _____

using children as pawns during divorce, and no serious thinker can dispute the trouble that haunts the children of divorce for years thereafter. 'Feminists' concoct bogus research about the role of the father being superfluous, but observation of real-world examples proves otherwise.

- Anyone who owns an expensive home in a community of families. The growing aversion of men for marriage will create fewer new families, and thus fewer buyers for those homes. I remind everyone that if they have 20% equity in their home and an 80% mortgage, even a 20% decline in home prices is a 100% decline in your equity, which might be all of your net worth. Detroit, the first major US city to see a loss of beta male employment prospects, saw **the average home price drop from \$98,000 as recently as 2003 to just \$14,000 today**. A decline smaller than this would devastate the net worth of remaining home owners, and can happen in any community of single-family homes. If you own a home, your net worth is inseparably tied to the formation and preservation of two-parent families.
- Anyone concerned about rising crime. 72% of African American children are born to single mothers, and the number among white children is approaching 30%. Furthermore, the 'mancession' will eventually ensure that the only means of survival for many men is to form gangs and take valuables by force. Unloved men, who in the past would have been paired with wives, are easy for both gangs and terrorist organizations to recruit.
- Anyone concerned about the widening federal and state budget shortfalls and medicare/healthcare costs, for which the state continues to insist on raising taxes rather than cut spending. Fewer men choosing to work the long hours needed to earn high incomes will break the model of the top 10% paying 75% of taxes, and more men being jailed for alimony arrears, not being good enough in bed, or defending himself from spousal violence will drain tax coffers. It costs \$60,000 a year to maintain a prisoner.
- Anyone who thinks the US Constitution is a valuable document. **'Innocent until proven guilty' does not apply in many areas of feminist-heavy law**. The previously discussed shadow state is using 'feminism' to conduct all sorts of horrible tyranny against innocent men, which greatly compromises America's ability to claim that it is still the land of the free.
- Anyone concerned about national security. As more men feel that this society is betraying him, fewer will risk their lives in the military only to find **that divorce lawyers have been persuading his wife to leave the marriage while he is deployed**. Coming home from one battlefield only to be inserted in another is a shameful betrayal of our finest young men. Furthermore, I have already mentioned how **British men are turning to Islamic courts in the hopes avoiding ruin at the hands of British misandrist laws**. Quite a few men may conclude that Islam offers them more than their native society that has turned against their gender, and will act towards self-preservation.
- Any woman who is appalled by the treatment of any woman who deviates from 'feminist' doctrine, and who is troubled by the words and actions of self-proclaimed 'feminists' today. If you believe that every action has an equal and opposite reaction, you should worry about what 'feminists' are courting by kicking a friendly dog too many times.
- Lastly, anyone with a young daughter or sister, who is about to enter a world where it is much harder for all but the most beautiful women to marry, where the costs of crazed 'feminism' are soon going to be transferred away from men and onto women, even if she had no interest in this doctrine of hate. As stated in the Executive Summary at the start, 'feminists' are leading average women into the abyss.

I could list even more reasons to care, but the point is clear. The biggest challenge of the decade is summarized before us.

Update (7/1/2012) : On this day, July 1, 2012, exactly 25% of the decade described in this article has passed. I did not include a poll on the original launch date of 1/1/2010, as the concepts described here were too radical for the majority of readers. But now that these ideas have become more mainstream, I can include a simple poll on the subject of whether we are indeed in a Misandry Bubble (poll closed after 60 days).



Conclusion

I am just an observer, and will not become an activist of any sort, although, as described earlier, being an 'inactivist' is also powerful. As a Futurist, I have to predict things before they become obvious to everyone else. Regular readers know of this website's track record of predictions being accurate, and heed my words when I say that the further inflation and subsequent precipitous deflation of the misandry bubble will define the next American decade. So here, on the first day of the '201x' decade, I am unveiling the article that will spawn a thousand other articles.

As mentioned at the top, what you have just finished reading is the equivalent of someone in 1997 predicting the entire War on Terror in vivid detail. The level of detail I have provided about the collapse of the Misandry Bubble will unfold **with comparable accuracy as when my co-blogger predicted the real estate bubble two years beforehand**, and the **exact level the stock market would bottom at, 6 months before the fact**. Similarly, misandry is the premier cultural bubble of this age.

This website has predicted that **the US will still be the only superpower in 2030**, but I am not so sure, so I will introduce a caveat that US vitality by 2030 is contingent on a satisfactory and orderly unwinding of the Misandry Bubble. It remains to be seen which society can create economic prosperity while still making sure both genders are treated well, and the US is currently not on the right path in this regard. For this reason, I am less confident about a smooth deflation of the Misandry Bubble. Deflate it will, but it could be a turbulent hurricane. Only rural America can guide the rest of the nation into a more peaceful transition. Britain, however, may be beyond rescue.

I want to extend my thanks to Instapundit, **Dr. Helen, Kim du Toit, The Spearhead, RooshV**, and many others for their support of this article.



Required Reading :

Democrats and Republicans Unite to Form Misandry Party

The Sixteen Commandments of Game

No Country for Burly Men

The Medicalization of Maleness

The Feminist War on Everything Civilized

Feminists : Filthy and Feral

Feminist Gulag : No Prosecution Necessary

Decivilizing : Human Nature Unleashed

Lust Story

F Roger Devlin articles

Wedded Abyss

Love

Note on Comments : As Typepad only allows 100 comments per page, here is a direct link to page [nine](#), where you can comment.

Just because I linked to a particular blog does NOT mean that I endorse all of the other views of that author. Are 'feminists' all willing to be responsible for all of the extremism that any other feminist utters (note that I have provided links to 'feminists' openly calling for slavery, castration, and murder of men without proving him guilty of anything)? Also, you will see Pavlovian use of the word 'misogyny' dozens upon dozens of times, so remember what I wrote about the importance of not taking that at face value, as it is merely a manifestation of projected misandry, as well as a defense mechanism to avoid taking responsibility for genuine wrongdoings of 'feminists'.

The Carnival of Creative Destruction

The Futurist · 1 June 2010 · Archived copy · Original

Words like 'disruption' and 'destruction' usually have negative meanings, and one may strain to find any good ways in which to use the terms. But today, the **accelerating rate of change** ensures that more technologies alter more aspects of life at an ever-quickenening rate. A little-understood dimension of this is the concept of Joseph Schumpeter's 'Creative Destruction', where the process of technological change topples existing norms and replaces them with new ones, often quite rapidly.

Technological diffusion was in a lull in 2008, as I pointed out at the time. But now, in 2010, I am happy to report that the recess has passed, and that the accelerating rate of change is rising back to the long-term exponential trendline (although it may not be fully back at the trendline until 2013, when people who have not been paying attention will be wondering why they were taken by surprise). The **Impact of Computing** continues to progress, infusing itself into a wider and wider swath of our lives, and speeding up the rate of change in complacently stagnant industries that never thought technology could affect them. Silicon Valley continues to be 'ground zero' for creative destruction, and complacent industries thousands of miles away could be toppled by someone working from their bedroom in Silicon Valley.

Just a few of the examples of creative destruction that is presently in process have been covered by prior articles here at The Futurist. These, along with others, are :

1) Video Conferencing is poised to disrupt not just airline and hotel industry revenues (which stand to lose tens of billions of dollars per year of business travel revenue), but the real-estate, medical, and aeronautical industries as well. Corporations will see substantial productivity gains from successful adoption of videoconferencing as a substitute for 50% or more of their travel expenses. Major mergers and acquisitions have happened in this sector in the last few months, and imminent price reductions will open the floodgates of diffusion. Skype provides a form of video telephony that is free of cost. **This is described in detail in my August 2008 article on the subject**, as well as in my earlier **October 2006 introductory article**.

2) Surface Computing, **which I wrote about in July of 2008**, has begun to emerge in a myriad of forms, from the handheld Apple iPad to the upcoming consumer version of the table-sized Microsoft Surface. This not only transforms human-computer interaction for the first time in decades, but the Apple 'Apps' ecosystem alters the utility of the Internet as well. All sizes between the blackboard and the iPad will soon be available, and by 2015, personal computing, and the Internet, will be quite different than they are today, with surfaces of varying sizes abundant in many homes.

3) The complete and total transformation of video games into the dominant form of home entertainment will be visible by 2012 through a combination of technologies such as realistic graphics, motion-responsive controllers, 3-D televisions, voice recognition, etc. The biggest casualty of this disruption will be television programming, which will struggle to retain viewers. Beyond this, the way in which humans process sensations of pleasure, excitement, and entertainment will irrevocably change. Thus, the way humans relate to each other will also change. **I have written about this in April 2006, with a follow-up in July 2009.**

4) The book-publishing industry has been stubbornly resistant to technology, as evidenced by their insistence as late as 2003 that manuscript queries be submitted by postal mail, and that a self-addressed stamped envelope be enclosed in which a reply can be sent. A completed manuscript would take a full 12 months to be printed and distributed, and the editors didn't even find this to be odd. Fortunately, two simultaneous disruptions are toppling this obsolete and unproductive industry from both ends. Print-on-demand services that greatly shorten the self-publishing process and entry-cost, such as iUniverse and Blurb, are now flexible and easy, while finished books can further avoid the paper-binding process altogether and be available to millions in e-book format for the Kindle and other e-readers. Books that cost, say, \$15 to print, bind, and distribute now cost almost zero, enabling the author and reader to effectively split the money saved. When e-readers are eventually available for only \$100, bookstores

that sell paper books will be relegated to surviving mostly on gifts, coffee table books, and cafe revenues. This is a disruption that is happening quickly due to it being so overdue in the first place, resulting in a speedy 'catchup'. [I wrote about this in more detail in December of 2009.](#)

5) [The automobile is undergoing multiple major transformations at once.](#) Strong, light nanomaterials are entering the bodies of cars to increase fuel efficiency, engines are migrating to hybrid and electrical forms, sub-\$5000 cars in India and China will lead to innovations that percolate up to lower the cost of traditional Western models, and the computational power engineered into the average car today leads to major feature jumps relative to models from just 5 years ago. The \$25,000 car of 2020 will be superior to the \$50,000 car of 2005 in every measurable way.

By 2016, consumer behavior will change to a mode where people consider it normal to 'upgrade' their perfectly functioning 6-year-old cars to get a newer model with better electronic features. This may seem odd, but people did not tend to replace fully functional television sets before they failed until the 2003 thin-TV disruption. The Impact of Computing pulls ever-more products into a rapid trajectory of improvement.

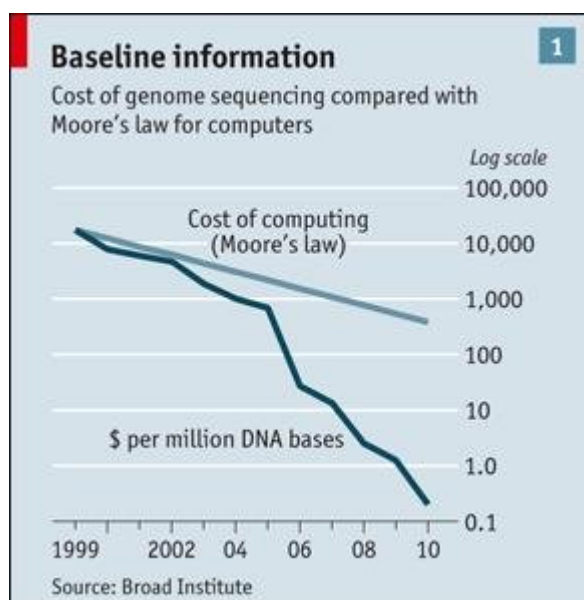
By 2018, self-driving cars will be readily available to the average US consumer, and will constitute a significant fraction of cars on the highway. This will revise existing assumptions about highway speeds and acceptable commute distances, and will further impede the real estate prices of expensive areas.

6) The Mobile Internet revolution, [which I wrote about in October of 2009,](#) is already transforming the way consumers in developed markets access the Internet. The bigger disruption is the entry of 1 billion new Internet users from emerging economies. While many of these people have relatively little education compared to Western Internet users, as the West shrinks as a fraction of total Internet mindshare, many Western cultural quirks that are seen as normal might be seen for the minority positions that they are. Thomas Friedman's concept of the world being 'flat' has not even begun to fully manifest.

7) [The energy sector is in the midst of multiple disruptions,](#) which will introduce competition between sectors that were previously unrelated. Electrical vehicles displace oil consumption with electricity, even while the electricity itself starts to be generated through nuclear, [solar,](#) and wind. The electrical economy will be further transformed by revolutions in [lighting](#) and [batteries.](#) Cellulostic ethanol will arrive in 2012, and further replace billions of gallons of gasoline. [I wrote in October 2007 why I want oil to surpass \\$120/barrel and stay there](#) (it subsequently was above that level for a mere 6-week period in 2008). This leads to why [I claim that 'Peak Oil', far from being fatal for civilization, will actually be a topic few people even mention in 2020.](#) The creative destruction in energy will extend to the geopolitical landscape, where we will see many petrotyrannies much weaker in 2020 than they are today.

8) Despite the efforts of Democrats to create a system unfavorable to advancement in healthcare and biotechnology, [innovation continues on several fronts](#) (partly due to Asian nations compensating for US shortfalls). One disruption is robotic surgery, where incisions can be narrow instead of the customary practice of making incisions large enough for the surgeon's hands, which in turn often necessitates sawing open the sternum, pelvis, etc. Intuitive Surgical is a company that already has a market cap of \$14 Billion.

The biggest disruption, however, is that the globalization of technology is enabling [medical tourism.](#) In the US, about twice as much is spent on healthcare per person as in other OECD countries. If manufacturing and software work can be offshored, so can many aspects of healthcare, which is much more expensive than manufacturing or software engineering ever became in the US. This will correct inflated salaries in the healthcare sector, return the savings to consumers, and force innovations and systemic improvements in all OECD countries.



9) By all accounts, the cost of genome sequencing has plunged faster than any other technology, ever (it is less clear how this was accomplished, and whether the next 4 years will see a comparable drop). I tend to be skeptical about such eye-popping numbers, because if something became so much cheaper so quickly, yet it still didn't sweep over the world, then maybe it was not so valuable after all.

But it is also possible that while the raw data is now available cheaply, there is not yet enough of a community that instructs people why they should get their genome sequenced, and how to use their data. [The Economist has a special report on the implications of inexpensive genome sequencing.](#)

10) Social media such as Facebook, Twitter, etc. are mostly inundated with the trivialities of young people, or of older people who never matured, who think they have an audience far larger than it is. However, these mediums have been used to horizontally organize interest groups and movements for political change that know no distance barriers or boundaries.

Blogs have shattered the hold that traditional media had on the release of information and opinions, and the revenues of newspapers, magazines, and network television have tumbled. The Tea Party movement in the US was started by a very small number of people, but has surged with a momentum that has reshaped the American landscape in just one year, and, irony of ironies, the Tea Party is spreading to overtaxed Britain. The next Iranian revolution will not only use Twitter and YouTube, but will have millions of collaborators outside of Iran, operating out of their own homes.

11) The financial services industry is overdue for disruption, and [this was the cover story of Wired Magazine for March 2010](#), and was a structure established in an era when computing power needed to process transactions was expensive. [Today, several startups are seeking to change the way money is transacted to eliminate this cut that incumbent companies take.](#) Major financial services companies will see shrinkages in revenue, and will have to innovate and create new value-added services, or accept a diminishment.

Aside from this effectively being a sizable 'tax cut' for the economy, this is particularly valuable as a complement to mobile Internet penetration in poorer regions, as the capacity to conduct web micro-transactions without fees will be an essential element of human development. The highly successful concept of micro-finance will be augmented when transaction fees that consumed a high percentage of these sub-\$10 transactions are minimized.

12) 3-D Printing will soon be accessible to small businesses and households. This transforms everything from commodity consumer goods to the construction of buildings. An individual could download a design and print it at home, rather than be restricted to only those products that can be mass produced. [It is quite possible that by 2025, construction of basic structures takes less than one-tenth the time that it does today](#), which, of course, will deflate the value of all existing buildings in the world at that time.

So we see there are at least 12 ways in which our daily lives will shift considerably in just the next few years. The typical process of creative destruction results in X wealth being destroyed, and 2X wealth being created instead, but by different people. For each of the 12 disruptions listed, 'X' might be as much as \$1 Trillion. As a result, the US economy might be mired in a long-term situation where vanishing industries force many laid off workers to start in new industries at the entry level, for half of their previous compensation, even as new fortunes created by the new industries cause net wealth increases. The US could see a continuation of high unemployment combined with high productivity gains and corporate earnings growth for several years to come. Big paydays for entrepreneurs will make the headlines frequently, right alongside stories of people who have to accept permanent 50% pay reductions. This would be the 'new normal'.

Income diversification is the golden rule of the early 21st century. Those that fail to create and maintain multiple streams of income are imperiling themselves. The hottest career one can embark on, which will never be obsolete, is that of the serial entrepreneur.

The TechnoSponge

The Futurist · 1 July 2010 · Archived copy · Original

After years of thinking about this, I have come up with a term that can describe the thoughts I have had about the new, 'good' type of deflation that is evading the notice of almost all of the top economists in the world today. This changes many of the most fundamental assumptions about economics, even as most economic thought is far behind the curve.

First, let us review some events that transpired over the last 2 years. To stave off the prospect of a deflationary spiral that could lead to a depression, the major governments of the world followed 20th-century textbook economics, and injected colossal amounts of liquidity into the financial system. In the US, not only was the Fed Funds rate lowered to nearly zero (for now 18 months and counting), but an additional \$1 Trillion was injected in.

However, now that a depression has been averted, and the recession has ended, we were supposed to experience inflation even amidst high unemployment, just like we did in the 1970s, to minimize debt burdens. But alas, there is still no inflation, despite a yield curve with more than 3% steepness, and a near-0% FF rate for so long. How could this be? What is absorbing all the liquidity?

In *The Impact of Computing*, I discussed how 1.5% of World GDP today comprises of products where the same functionality can be purchased for a price that halves every 18 months. 'Moore's Law' applies to semiconductors, but storage, software, and some biotech are also on a similar exponential curve. This force makes productivity gains higher, and inflation lower, than traditional 20th century economics would anticipate. Furthermore, the second derivative is also increasing - the rate of productivity gains itself is accelerating. 1.5% of World GDP may be small, but what about when this percentage grows to 3% of World GDP? 5%? We may only be a decade away from this, and the impact of this technological deflation will be more obvious.

Most high-tech companies have a business model that incorporates a sort of 'bizarro force' that is completely the opposite of what old-economy companies operate under : *The price of the products sold by a high-tech company decreases over time*. Any other company will manage inventory, pricing, and forecasts under an assumption of inflationary price increases, but a technology company exists under the reality that all inventory depreciates very quickly (at over 10% per quarter in many cases), and that price drops will shrink revenues unless unit sales rise enough to offset it (and assuming that enough unit inventory was even produced). This results in the constant pressure to create new and improved products every few months just to occupy prime price points, without which revenues would plunge within just a year. Yet, high-tech companies have built hugely profitable businesses around these peculiar challenges, and at least 8 such US companies have market capitalizations over \$100 Billion. 6 of those 8 are headquartered in Silicon Valley.

Now, here is the point to ponder : We have never had a significant technology sector while also facing the fears (warranted or otherwise) of high inflation. When high inflation vanished in 1982, the technology sector was too tiny to be considered a significant contributor to macroeconomic statistics. In an environment of high inflation combined with a large technology industry, however, major consumer retail pricepoints, such as \$99.99 or \$199.99, become more affordable. The same also applies to enterprise-class customers. Thus, demand creeps upwards even as cost to produce the products goes down on the same Impact of Computing curve. *This allows a technology company the ability to postpone price drops and expand margins, or to sell more volume at the same nominal dollar price*. Hence, higher inflation causes the revenues and/or margins of technology companies to rise, which means their earnings-per-share certainly surges.

So what we are seeing is the gigantic amount of liquidity created by the Federal Reserve is instead cycling through technology companies and increasing their earnings. *The products they sell, in turn, increase productivity and promptly push inflation back down*. Every uptick in inflation merely guarantees its own pushback, and the 1.5% of GDP that mops up all the liquidity and creates this form of 'good' deflation can be termed as the 'Technosponge'. So how much liquidity can the Technosponge absorb before saturation?

At this point, if the US prints another \$1 Trillion, that will still merely halt deflation, and there will be no hint of inflation at all. It would take a full \$2 Trillion to saturate the techno-sponge, and temporarily push consumer inflation to even the less-than-terrifying level of 4% while also generating substantial jumps in productivity and tech company earnings. In fact, the demographics of the US, with baby boomers reaching their geriatric years, are highly deflationary (and this is the bad type of deflation), so the US would have to print another \$1 Trillion every year for the next 10 years just to offset demographic deflation, and keep the Technosponge saturated.

A Technosponge that is 1.5% of GDP might be keeping CPI inflation at under 2%, but when the techno-sponge is 3% of GDP, even trillions of dollars of liquidity won't halt deflation. Deflation may become normal, even as living standards and productivity rise at ever-increasing rates. The people who will suffer are holders of debt, particularly mortgage debt. Inflating away debt will no longer be a tool available to rescue people (and governments) from their errors. The biggest beneficiaries will be technology companies, and those who are tied to them.

But to keep prosperity rising, productivity has to rise at the maximum possible rate. This requires the Technosponge to be kept full at all times - the 'new normal'. Thus, the printing press has to start on the first \$1 Trillion now, and printing has to continue *until* we see inflation. Economists will be surprised at how much can be printed without seeing any inflation, and will not be able to draw the connection about why the printed money is boosting productivity.

Related :

[The Impact of Computing](#)

[Timing the Singularity](#)

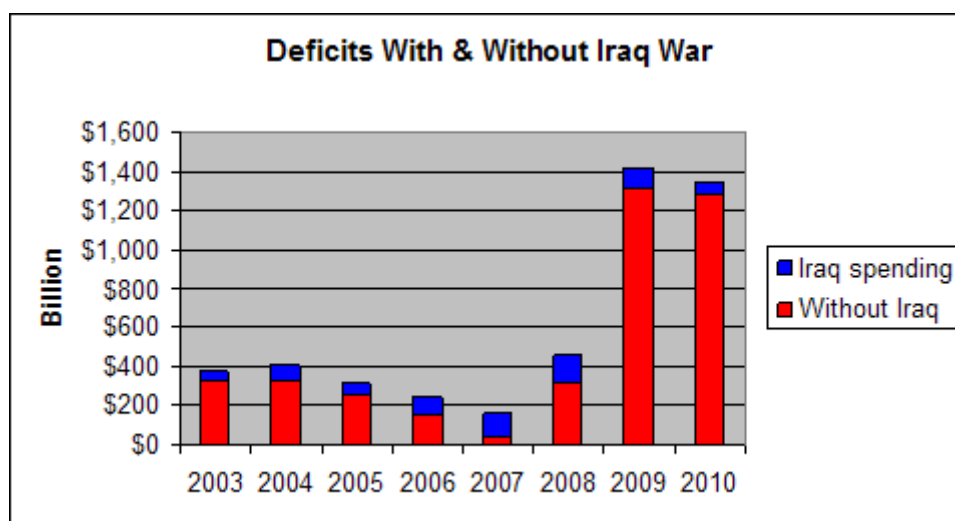
Taxation and Recession

The Futurist · 1 September 2010 · Archived copy · Original

On October 23, 2009, I wrote that if the Bush tax cuts were allowed to expire at the end of 2010, the US would experience another recession. That ultimatum is now squarely facing the US economy, and I have a few assorted thoughts on some major areas that are being under-discussed.

a) I find it revealing that leftists are quick to parrot some memorized garbage about why taxes should rise back to what they were during the Clinton era, *yet the same leftists have no interest in returning to the spending levels of the Clinton era.* I am perfectly fine with returning to Clinton-era tax brackets if we also return to Clinton-era spending. Any takers? Come on, any takers?

(crickets chirping as leftists flee to avoid having to address the contradiction between wanting Clinton-era tax levels but not Clinton-era spending levels).



If cornered, a leftist will

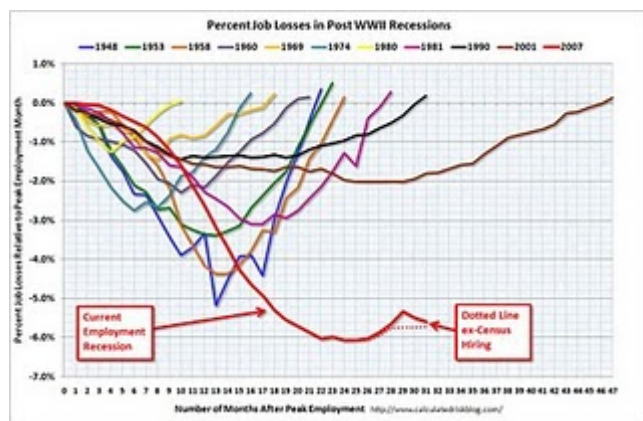
change the subject and say that the Iraq War is the reason spending is high (note that this does not address the point of why they do not wish to return to Clinton-era spending levels). However, contrary to leftist propaganda, the Iraq War actually cost less than the Obama stimulus, **as per the chart below from the Washington Examiner.** In fact, exclude the Iraq War, and the budget deficit was all but erased by 2007. At least **the Iraq War was ultimately successful.** But from 2011 onwards, the deficit is set to widen further if the tax rates rise. GDP will shrink below the current projections, causing tax revenue to shrink despite the higher rate of taxation. Republicans winning a few seats in the 2010 Congressional election may halt the tax increase, but will not reduce spending, as Republicans are far too politically uncreative to overturn this increased spending.

b) How a person feels about the capital gains tax is an intoxicating test of how true to free market principles a person is. The fact that capital gains are far more concentrated among the wealthy than wage income drives socialists into a crazed frenzy that will have them vehemently demanding that capital gains be taxed at 80% or more. However, raising the tax rate of capital gains is the way to inflict the greatest economic damage for the least increase (in fact, often a decrease) in tax revenue. This is simply because of the fact that capital is highly mobile. Russia, China, and India all have long-term capital gains tax rates of 0%, and short term rates no higher than 15%. By contrast, the US long term rate in states like New York and California currently approaches 25%, will rise to 30% with the expiry of the Bush tax cuts, and rise further to 34% under an Obamacare supplemental tax. Capital, thus, finds a better climate in Russia, China, and India than in the US, and trillions of dollars have already departed from the US. Who won the Cold War again? Or rather, is that the wrong question, with the right question being "Where has the traveling disease of socialism migrated towards?"

There should be no capital gains tax at all. This is for the simple reason that if a person sells an appreciated asset, and then pays a capital gains tax, they no longer can buy back the same asset that they had just sold. For those who

screech about the 'rich' making too much, remember that taxing capital gains makes them invest less, which means they will employ fewer people. *Everyone* is either employed by a rich person, or sells to people employed by a rich person, so punitive capital gains taxes always trickle down to people who are not rich.

c) This brings us to the original question of a new recession in 2011. Since the technical definition of a recession is quite limited, it is easy to concoct a 'stimulus' that pulls demand forward, causes a technical 'end' to the recession (in Q309 in the most recent case), and then is concluded by a lengthy hangover that comes perilously close to a new recession in its own right, discussed under the term of a 'double dip'. All of this is a greatly distracted discussion.



The most important measure of economic health, jobs, has not only not seen any recovery since the end of the prior recession in Q309, but is destined to languish through the end of 2011 and possibly much later. This chart from Calculated Risk (click to enlarge) shows that only has the current recession been deeper than all others in the last 60 years, but it has kept jobs at a very low level for over a year. Not only has this recession extended the vertical axis in this chart, but it is certainly destined to extend the horizontal axis as well (unless you believe that 8 million jobs will be created in the next 18 months). So aside from mention of a 'double dip', this recession is already at least 3 times worse than the average post-war recession. There is no chance of a full recovery to breakeven in the remaining 18 months of the existing horizontal axis of this chart, and it is improbable even by 2013, extending the employment recession to a full 6 years at least. The **Techno-sponge** keeps liquidity lower than policy-makers realize it is, and a rise in tax rates could dry up what little trickle of job growth is currently being seen.

d) Socialism is much more rigged in favor of the ultrawealthy than capitalism is. This is because in capitalism, there is continuous churn in the ranks of the wealthy, and anyone can be displaced by a new technology or new business model. Everyone has a chance to rise, and everyone at the top needs to continue to compete to stay in place.

In socialism, however, only the ultrawealthy can afford to bypass the oppressive rules placed on everyone else (by hiring lawyers, bribing judges and government officials, etc.). The ultrawealthy thus can erect a wall between them and the rest, and make it nearly impossible for an upper-middle-class person to become wealthy on the merit of innovation or business savvy. Hence, any attempt to create a socialist utopia ends up making it easy for the ultrawealthy to build large moats around their incumbent positions.

e) Let me also add a dash of gender psychology here, and explain why many men are capitalistic, while many women are socialistic. As explained before, female hypergamy dictates that women are biologically driven to share their genes with only the best possible man, and women would rather share a top man with other women than have a lesser man all to themselves. If it is clear that the men at the top will remain there (socialism), there is much less risk in the decision-making process for women. In a capitalistic environment, the men at the top today may not be there in a decade, and there is a far riskier 'stockpicking' aspect to choosing which man's genes are going to have long-term value. Thus is further complicated by the fact that a 'valuable' man in the past usually was so due to fighting skill and capacity for violence, while a 'valuable' man today is one with analytical/entrepreneurial skill, which was not easily monetized in the past. But the human brain does not evolve as fast as it needs to, **and if you wonder why a serial killer immediately gets love letters from a large number of women** (including educated,

married women), but the founders of Google and Facebook do not, this is why. The serial killer has proven himself to be a 'valuable' man as per metrics women are evolved to respond to, that were determinants of male power, before modern society existed. By appearing in the media for having been a serial killer, has received a resounding stamp of validation on his credentials, and is certified as an apex male.

Along the same vein, women are also driven to extract resources from lesser men while cutting them off from the better things that society has to offer. Thus, I find it necessary to mention that of all the socialist policies that are obstructing market forces and preventing job creation, organized misandry is a greatly overlooked one. **'Feminist' groups like NOW have lobbied for stimulus dollars to be diverted towards themselves, and away from areas where fewer women work (such as infrastructure and manufacturing).** Passage of the 2009 'stimulus' immediately led to an unprecedented chasm between male and female unemployment rates. This sort of shameless vote-purchasing and disenfranchisement of men, zealously enacted by Democrats and almost as zealously condoned by whiteknighting Republicans, will prove to be very corrosive to the long-term economic health of the US economy. This is where Republicans are fatally flawed - they completely fail to see how they themselves undermine their own goals. I will have much more to say on this before election day.

These five thoughts, though not quite related to each other, have been overlooked among the oceans of ink expended in commentary about the current malaise. Perhaps we are on the brink of a breaking point, where government wastage will soon cause visible declines in quality of life, where overburdening productive workers (men in particular) causes a long overdue backlash, and where the little-understood technological deflation quickens in the absence of much-needed liquidity injections. Let us see how far this unique blend of government incompetence and corruption can go.

Related :

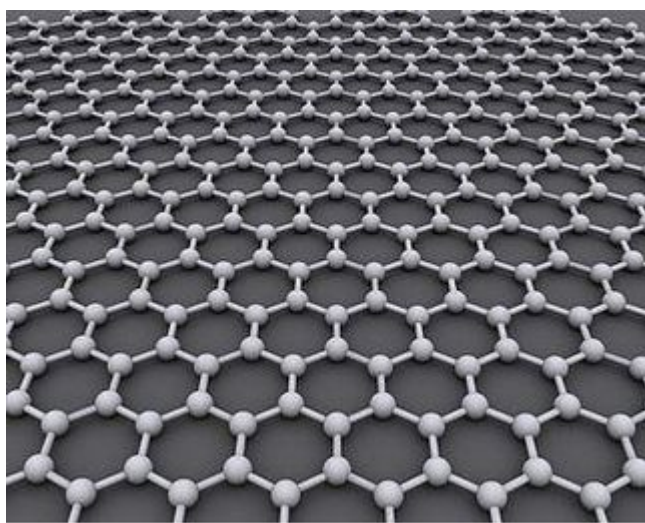
[Eight Ways to Supercharge the US Economy](#)

Carbonara

The Futurist · 1 November 2010 · Archived copy · Original

Observers have been waiting for carbon nanotubes, buckyballs, and graphene to transform the world for quite some time, and the wait has been longer than they expected. Enthusiasts for this new miracle material had all but vanished. Is this warranted? Where does the state of innovation in various forms of carbon, that could yield ultra-strong, ultra-light materials and superfast computing really stand?

CNET had [an article just last month about the multiple disruptions that the various allotopes of carbon are about to make](#). That is quite exciting, except that [CNET also had a similar article in 2003](#). Similarly, Ray Kurzweil extolled carbon nanotubes as a successor to silicon quite heavily in 1999, but not quite as much now, even though that supposed transition would be much closer to the present. This does not mean that Kurzweil's estimation was in error, but rather that the technology was unexpectedly stagnant during the early 2000s. So let us examine why there was such an interruption, and whether progress has since resumed.



[I wrote in 2009 about how we had undergone a multi-year nanotech winter, and how we were emerging from it in 2009](#). As anticipated, carbon nanotubes are now finally lowering in price, and being produced at a scale that could start making an impact. Sure enough, activity began to stir right as I predicted, and [the 2010 Nobel Prize in physics has been awarded to research in graphene](#). Just like CNET's article, [Wired also has an article about the diverse applications that graphene could revolutionize](#). Combining the two articles, we can summarize the core possibilities of carbon allotopes as follows :

Ultra-dense computing and storage : Graphene transistors smaller than 1 nanometer have been demonstrated. Carbon allotopes could keep the exponential doubling of both computing and storage capacity going well into the 2030s.

Carbon Fiber Vehicles : This lightweight, ultrastrong material can save vast amounts of fuel by reducing the weight of cars and aeroplanes. While premium products such as the \$6000 Trek Madone bicycles are already made from carbon fiber, greater volume is reducing prices and will soon make the average car much lighter than it is today, increasing fuel efficiency and reducing traffic fatalities.

Energy Storage : Natural Gas is not only much cheaper than oil per unit of energy (oil would have to drop to about \$30 to match current NG prices), but the supply of NG is more evenly distributed across the world than the oil supply. The US alone has an enormous reserve of natural gas that could ensure total energy independence. The main problem with NG is storage, which is the primary reason oil displacement is not happening rapidly. But microporous carbon can effectively act as a sponge for natural gas, enabling safe and easy transport. This could potentially change the entire energy map.

There are other applications beyond these core three, but suffice it to say, the allotopes of carbon can perform a

greater variety of functions than any other material available to us today. Watch for indications of carbon allotopes popping up in the strangest of places, and know that each emergence drives the cost down ever lower.

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Milli, Micro, Nano, Pico

The End of Petrotyranny

The Futurist · 1 July 2011 · Archived copy · Original

As oil prices remain high, we once again see murmurs of anticipated doom from various quarters. Such fears are grossly miscalculated, as I have described in my 2007-08 articles about [how oil at \\$120/barrel creates desirable chain reactions](#), as well as [my rebuttal to the poorly considered beliefs of peak oil alarmists](#), who seem capable of being sold not one, but two bridges in Brooklyn. Today, however, I am going to combine the concepts in both of those articles with some new analysis I have done to enable us to predict when oil will lose the economic power it currently holds. You are about to see that not only are peak oil alarmists wrong, but they are just about as wrong as those predicting in 1988 that the Soviet Union would soon dominate the world, and will soon be equally worthy of ridicule.

Unenlightened Punditry and Fashionable Posturing :

As I mentioned in a [previous article](#), many observers incessantly contradict themselves on whether they want oil to be inexpensive, or whether they want higher oil prices to spur technological innovations. One of the most visible such pundits is Thomas Friedman, who has many interesting articles on the subject, such as his 2007 piece titled ['Fill 'Er Up With Dictators'](#) :

But as oil has moved to \$60 to \$70 a barrel, it has fostered a counterwave — a wave of authoritarian leaders who are not only able to ensconce themselves in power because of huge oil profits but also to use their oil wealth to poison the global system — to get it to look the other way at genocide, or ignore an Iranian leader who says from one side of his mouth that the Holocaust is a myth and from the other that Iran would never dream of developing nuclear weapons, or to indulge a buffoon like Chávez, who uses Venezuela's oil riches to try to sway democratic elections in Latin America and promote an economic populism that will eventually lead his country into a ditch.

But Mr. Friedman is a bit self-contradictory on which outcome he wants, as evidenced across his New York Times columns.

Over here, he says :

In short, the best tool we have for curbing Iran's influence is not containment or engagement, but getting the price of oil down

And here, he says :

So here's my prediction: You tell me the price of oil, and I'll tell you what kind of Russia you'll have. If the price stays at \$60 a barrel, it's going to be more like Venezuela, because its leaders will have plenty of money to indulge their worst instincts, with too few checks and balances. If the price falls to \$30, it will be more like Norway. If the price falls to \$15 a barrel, it could become more like America

Yet over here he says :

Either tax gasoline by another 50 cents to \$1 a gallon at the pump, or set a \$50 floor price per barrel of oil sold in America. Once energy entrepreneurs know they will never again be undercut by cheap oil, you'll see an explosion of innovation in alternatives.

As well as over here :

And by not setting a hard floor price for oil to promote alternative energy, we are only helping to subsidize bad governance by Arab leaders toward their people and bad behavior by Americans toward the climate.

All of these articles were written within a 4-month period in early 2007. Both philosophies are true by themselves, but they are mutually exclusive. Mr. Friedman, what do you want? Higher oil prices or lower oil prices? Such confusion indicates how the debate about energy costs and technology is often high on rhetoric and low on analysis.

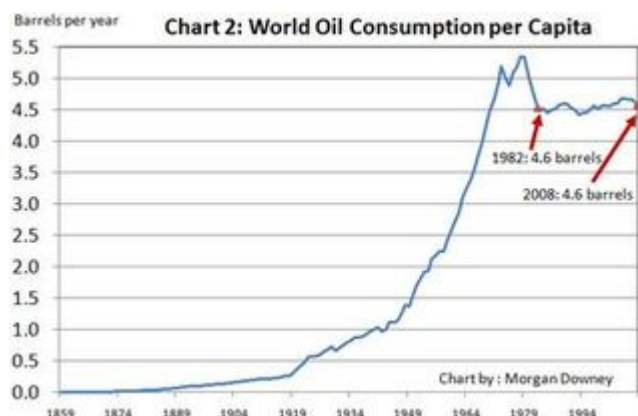
Much worse, however, is the fashionable scaremongering that the financial media uses to fill up their schedule, amplified by a general public that gets suckered into groupthink. To separate the whining from the reality, I apply the following simple test to verify whether people are actually being pinched by high oil prices or not. If a large portion of average Americans have made arrangements to carpool to work (as was common in the 1970s), then oil prices are high. Absent the willingness to make this adjustment, their whining about gasoline is not a reflection of actual hardship. This enables us to declare that oil prices are not approaching crisis levels until most 10-mile-plus commuters are carpooling, that too in groups of three, rather than just two. Coordinating of carpools is thus the minimum test of whether oil prices are actually causing any significant changes in behavior.

Fortunately, \$100 oil, a price that was considered a harbinger of doom as recently as 2007, is now not even enough to induce carpooling in 2011. This quiet development is remarkably unnoticed, and conceals the substantial economic progress that has occurred.

Economic Adaptations :



The following chart from Calculated Risk (click to enlarge) shows the US trade deficit split between oil and non-oil imports. This chart is not indexed as a percentage of GDP, but if it were, we would see that oil imports at \$100/barrel today are not much higher of a percentage of GDP than in 1998, when oil was just \$20/barrel. In fact, the US produces much more economic output per barrel of oil compared to 1998. We can thus see that unlike in 1974 when the US economy has much less demand elasticity for oil, today the ability of the economy to adjust oil consumption more quickly in reaction to higher prices makes the bar to experience an 'oil shock' much harder to clear. US oil imports will never again attain the same percentage of GDP as was briefly seen in 2008.



Of even more importance is the amazingly consistent per capita consumption of oil since 1982, which has remained at exactly 4.6 barrels/person despite a tripling real GDP per capita during the same period (chart by Morgan Downey). This immediately deflates the claim that the looming

economic growth of China and India will greatly increase oil consumption, since the massive growth from 1982 to 2011 did not manage to do this. At this point, annual oil consumption, currently at around 32 billion barrels, only rises at the rate of population growth - about 1% a year.

This leads me to make a declaration. 32 billion barrels at around \$100/barrel is \$3.2 Trillion in annual consumption. This is currently less than 5% of nominal world GDP. I hereby declare that :

Oil consumption worldwide will never exceed \$4 Trillion/year, no matter how much inflation, political turmoil, or economic growth there is. Thus, 'Peak Oil Consumption' happens long before 'Peak Oil Supply' ever could.

This would mean that oil would gradually shrink as a percentage of world GDP, just as it has shrunk as a percentage of US GDP since 1982. Even when world GDP is \$150 Trillion, oil consumption will still be under \$4 Trillion a year, and thus a very small percentage of the economy. Mark my words, and proceed further to read about how I can predict this with confidence.

The Carnival of Creative Destruction :

There are at least seven technologies that are advancing to reduce oil demand by varying degrees, many of which have been written about separately here at The Futurist :

1) Natural Gas : Technologies that aid the discovery of natural gas have advanced at great speed, and supplies have skyrocketed to a level that exceeds anything humanity could consume in the next few decades. The US alone has enough natural gas to more than offset all oil consumption, and the price of natural gas is currently on par with \$50 oil.

2) Efficiency gains : From innovations in engine design, airplane wing shape, reflective windows, and lighter nanomaterials, efficiency is advancing rapidly, to the extent that economic growth no longer increases oil consumption per capita, as described earlier. There are many options available to consumers seeking 40 mpg or higher without sacrificing too much power or size, and **I predicted back in early 2006 that in 2015, a 4-door family car with a 240 hp engine would deliver 60 mpg (or equivalent) yet still cost no more than \$35,000 in 2015 dollars.** People scoffed at that prediction then, but now it seems quite safe.

3) Cellulose Ethanol and Algae Oil : Corn ethanol was never going to be suitable in cost or scale, but the infrastructure established by the corn ethanol industry makes the transition to more sophisticated forms of ethanol production easier. But fuels from switchgrass and algae are much more cost-effective, and will be ramping up in 2012. **Solazyme** is an algae oil company that went public recently, and already has a market capitalization of \$1.5 Billion.

4) Batteries : Most of the limitations of electric and hybrid vehicles stem from shortcomings in battery technology. **However, since batteries are improving at a rate that is beginning to exceed the traditional 5-8% per year,** and companies such as Tesla are able to lower the cost of their fully electric vehicles, the knee of the curve is near.

5) Telepresence : Telepresence, while expensive today, will drop in price under the **Impact of Computing** and displace a substantial portion of business air travel, **as described in detail here.** By 2015, geographically dispersed colleagues will seem to be closer to each other, despite meeting in person less often than they did in 2008.

6) Wind Power : Wind Power already generates almost 3% of global electricity consumption, and is growing quickly. When combined with battery advances that improve the range and power of electric and plug-in hybrid vehicles, we get two simultaneous disruptions - oil being displaced not just by electricity, but by wind electricity.

7) Solar Power : This source today generates the least power among those listed here. But it is the fastest growing of the group **with multiple technologies advancing at once,** and with decades of **steady price declines finally reaching competitive pricepoints.** It also has many structural advantages, most notably the fact that it be deployed

to land that is currently unused and inhospitable. Many of the countries with the fastest growth in energy consumption are also those with the greatest solar intensity.

Plus, these are just the technologies that displace oil demand. There are also technologies that increase oil supply, such as supercomputing-assisted oil discovery and new drilling techniques. Supply-increasing technologies work to reduce oil prices and while they possibly slow down oil demand displacement, they too work to weaken petrotyranny.

The problem in any discussion of these technologies is that the debate centers around an 'all or none' simplicity of whether the alternative can replace all oil demand, or none at all. That is an unnuanced exchange that fails to comprehend that each technology only has to replace 10% of oil demand. Natural gas can replace 10%, ethanol another 10%, efficiency gains another 10%, wind + solar another 10%, and so on. Thus, if oil consumption as a percentage of world GDP is lower in a decade than it is today, that itself is a huge victory. It hardly matters which technology advances faster than the others (in 2007, natural gas did not appear as though it would take the lead that it enjoys today), what matters is that all are advancing, *and that many of these technologies are highly complementary to each other.*

What is also overlooked is how quickly the pressure to shift to alternatives grows as oil becomes more expensive. If, say, cellulose ethanol is cost-effective with oil at \$70, then oil at \$80 causes a modest \$10 dollar differential in favor of cellulose. If oil is \$120, then this differential is now \$50, or five times more. Such a delta causes much greater investment and urgency to ramp up research and production in cellulose ethanol. Thus, each increment in oil price creates a much larger zone of profitability for any alternative.

The Cost of Petrotyranny :



This map of nations scaled in proportion to their petroleum reserves (click to enlarge) replaces thousands of words. Some contend that the easy money derived from exporting oil leads to inevitable corruption and the financing of evil well beyond the borders of petro-states, while others lament the misfortune that this major energy source is concentrated in a very small area containing under 2% of the world's population. Other sources of energy, such as natural gas, are much more evenly distributed across the planet, and this supply chain disadvantage is starting to work against oil.

However, as we saw in the 2008 article, many of these regimes are dancing on a very narrow beam only as wide as the span between oil of \$70 and \$120/barrel. While a price below \$70 would be fatal to the current operations of Iran, Venezuela, and Russia, even a high price leads to a shrinkage in export revenue, as domestic consumption rises to reduce export units to a greater degree than can be offset by a price rise. Furthermore, higher prices accelerate the advance of the previously mentioned technologies. For the first time, we can now estimate how long oil can still hold such an exalted economic status.

Quantifying the Remaining Petro-Yoke :

For the first time, we can make the analysis of both technological and political pressure exerted by a particular oil price more precise. We can now quantify the rate of technological demand destruction, and predict the actual number of years before oil ceases to have any ability to cause economic recessions, and regimes like Iran,

Venezuela, and Russia no longer can subsist on oil exports to the same degree. This brings me to the second declaration of this article :

From the start of 2011, measure the dollar-years of area enclosed by a chart of the price of oil above \$70. There are only 200 such dollar-years remaining for the current world petro-order. We can call this the 'Law of Finite Petrotyranny'.

Allow me to elaborate.

Through some proprietary analysis, I have calculated that the remaining lifetime of oil's economic importance as follows :

- From the start of 2011, take the average price of West Texas Intermediate (WTI), Brent, or NYMEX oil, and subtract \$70 from that, each year.
- Take the number accumulated, and designate that as 'X' dollar-years.
- As soon as X equals to 200 dollar-years, then oil will not just fall below \$70, but will never again be a large enough portion of world GDP to have a significant macroeconomic impact.



You can plug in your own numbers to estimate the year in which oil will cease to exert such power. For example, if you believe that oil will average \$120, which is \$50 above the \$70 floor, then the X points are expended at a rate of \$50/year, meaning depletion at the end of 2014. If oil instead averages just \$100, then the X points are expended at \$30/year, meaning it will take 6.67 years, or until late 2017, to consume them. Points are only depleted when oil is above \$70, but are not restored if oil is below \$70 (as research projects may be discontinued or postponed, but work already done is not erased). For those who (wrongly) insist that oil will soon be \$170, the good news for them is that in such an event they will see the X points depleted in just two short years. The graph provides 3 scenarios, of oil averaging \$120, \$110, and \$100, and indicating in which year such a price trend would exhaust the 200 X points from points A, B, and C, which is the area of each of the three rectangles. In reality, price fluctuations will cause variations in the rate of X point depletion, but you get the idea.

Keep in mind the Law of Finite Petrotyranny, and on that basis, welcome any increase in oil prices as the hastening force of oil replacement that it is. My personal opinion? We average about \$100/barrel, causing depletion of the X points in 2017 (scenario 'C' in green).

Conclusion :

So what happens after the Law of Finite Petrotyranny manifests itself? Let me pre-empt the strawmen that critics will erect, and state that oil will still be an important source of energy. But most people will no longer care about

the price of oil, much as the average person does not keep track of the price of natural gas or coal. Oil will simply be a fuel no longer important enough to cause recessions or greatly alter consumer behavior through short-term spikes. Many OPEC countries will see a great reduction in their power, and will no longer be able to placate their citizens through petro-handouts alone. These countries would do well to act now and diversify their economies, phase in civil liberties while they can still do so incrementally, and prepare for a future of much lower leverage over their current customers.

So cheer oil prices higher so that the X points get frittered away quickly. It will be fun.

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Recessions vs. Depressions

The Futurist · 2 December 2011 · Archived copy · Original

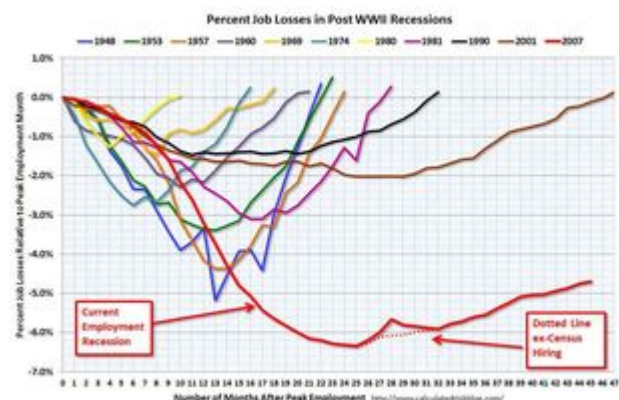
It is time for an economics lesson that most actual professors of economics will never deliver, because the contradiction in what I am about to explain is often not visible to those immersed within the orthodoxy of their field.

We often hear of 'recessions' as small events and 'depressions' as major events, however the two are defined in a very apples-to-oranges way, that is about to become exposed as we are entering a period that does not fit within either.

A **recession** only counts the period of the decline, but not the period that it takes for the economy to climb back to the previous high water mark.

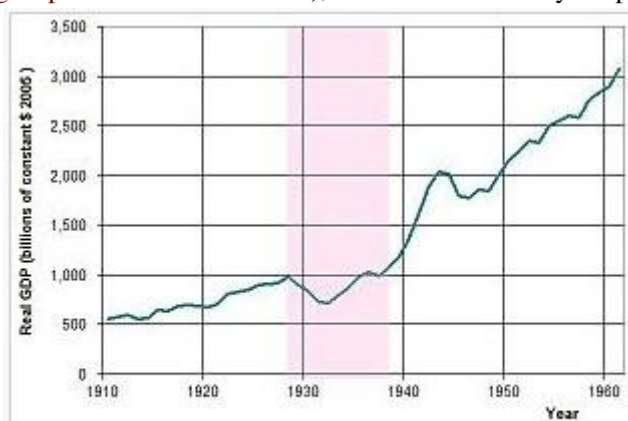
A **depression** counts not only the decline but also the period it takes to return to the high water mark.

Thus, recessions are defined by a definition that is incomplete and deceptive for not accounting for whether the recovery is rapid or slow, while depressions have a more accurate and complete definition. The governments of the US and other nations have gotten away with this since almost every recovery out of a recession since 1948 was rapid enough that this flaw was not noticed. But no longer.



The last recession was deemed by the NBER to have ended in June 2009. However, note this chart from Calculated risk (click to enlarge), which indicates that payroll employment will take several more years to reach its high water mark from before the recession, far longer than any prior recession. **That we may be heading into another recession now** extends this process even longer.

Now, about depressions, there are some myths that have to be corrected. Some depressions are shallow but very long (like the 'Long Depression' from 1873-96), while others are very deep but shorter. Naturally, when the term



USA annual real GDP from 1910–60, with the years of the Great Depression (1929–1939) highlighted.

'depression' arises, most people think of the most recent one, which was the Great Depression from 1929-39, which a few people still alive today are old enough to

remember. However, a closer look at the Great Depression reveals that the sharp downturn that started in 1929 ended in 1933, and that from 1934 onwards, there was rapid improvement. For all the 'Grapes of Wrath' imagery, anyone who managed to survive until 1934 saw continuous and persistent improvement in economic conditions from the deep bottom.

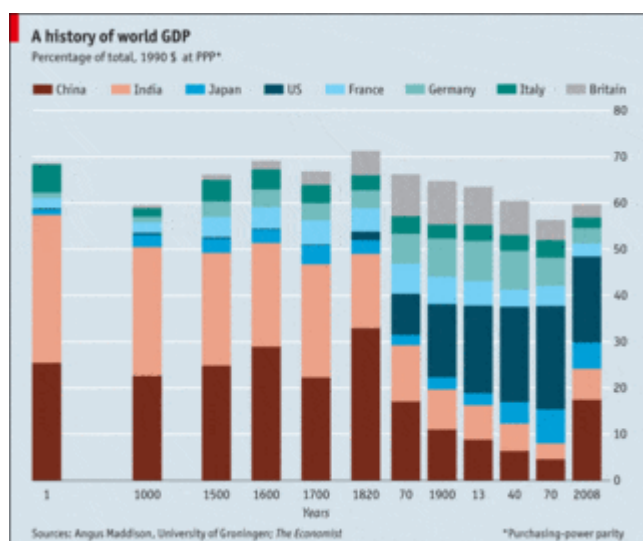
Now, if we measure this period by the standards that recessions are measured by, there was a steep recession from 1929-33, followed by a recovery, and a much smaller recession in 1937-38. The two recessions would seem unrelated, and the entire 1929-39 period would not be combined into one event. Clearly, the failure to recapture the 1929 high water mark is the determinant of the depression classification lasting until 1939.

Will the present period from 2008 to ~2017(?) be classified as a shallow depression? Perhaps, but this will not be declared such until several years after it is over. Rather, the proper way to assess this economic episode is to measure its deviation from the long-term exponential trendline, and not for the US, but rather in relation to World GDP.

Relative GDP Gains 2007-11		Nominal GDP (\$Trillion)		
		2007	2011	Gain(%)
Country	US	\$14.06	\$15.06	7%
	China	\$3.50	\$6.98	99%
	India	\$1.15	\$1.84	60%

Since the start of 2008, US nominal GDP has grown a mere 7%, while a combination of differences in inflation and real GDP growth has ensured that the nominal \$US GDP of China has grown 99% and India 60% (source : IMF). Never in the last 140+ years has the GDP of the US lagged so much in relation to any other large economies, and shrank so much as a percentage of total world GDP.

If the US were to measure itself based on the rate at which other large countries are gaining ground, then this is the worst period since the Great Depression. Europe, as usual, is doing even worse than the US.



This leads to the longer-term assessment, which is that perhaps we are in a midst of seeing Asia correct to a historically normal percentage of world GDP. As [this chart from The Economist shows](#) (click to enlarge), at no time before 1820 was India + China less than 45% of world GDP on a PPP basis, and this chart ends in 2008, before most of the aforementioned India-China surge that I discussed earlier. While India began to decline in 1700, China was at a very high point as recently as 1820.

Perhaps the rapid gains that India and China are seeing now is merely a reversion back to historical norms established over 5000 years, where these two nations were always at least 45% of world GDP. If that is the case, the 1820-2020 period was an atypical 200-year golden era for the 'West'. Indeed, the major European powers have already shrunk below any relative size they have been since 1500. The US, of course, is a nation that did not exist for most of the period this chart covers, and thus may not shrink away the way that Europe has, and despite a classification of being part of the 'West' (a grouping Japan is also often shoehorned into), may align closer to Asia

due to sheer gravitational pull.

Since **economic growth is exponential and accelerating**, we now live in an age when it is possible to have such a large deviation from the trendline, while still experiencing minimal absolute growth. This may not be called a 'depression' according to the way this was defined in the 20th century, but for the US it is a departure of a similar magnitude as the 1930s.

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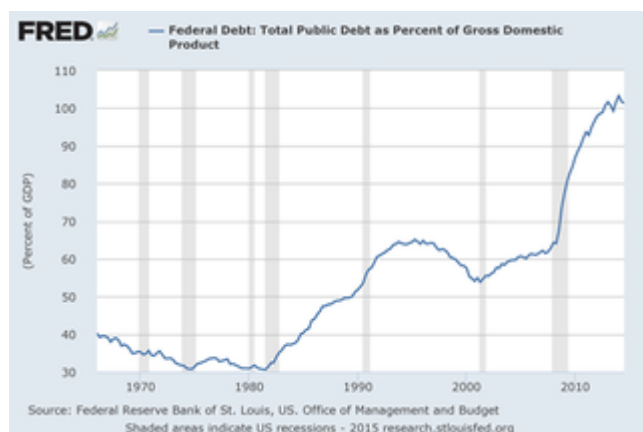
Why Baby Boomers Will Have a Troubled Retirement

The Futurist · 9 March 2012 · Archived copy · Original

- by Imran Khan

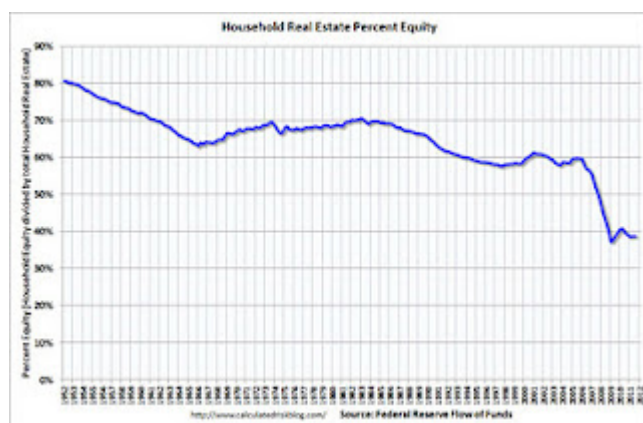
Amongst people under the age of 35 in America, a predominant view that I see emerging is how the Baby Boom generation in the US (born 1946-64) is consuming the future of the younger generation in an attempt to finance an opulent retirement. While this may indeed be the political goal of at least some Boomers and the core mission of many retiree organizations, the fiscal situation in the US is far worse for the Boomers than they realize, even for those who don't seek to extract from younger people.

Boomers and Entitlements : While the first Baby Boomer turned 65 in 2011, the median Boomer (born in 1955) turns 65 in 2020, and the last ones turn 65 in 2029, which indicates that their big harvesting of Social Security and Medicare from the government has not even begun yet. Given **rising life expectancies**, the peak years of Boomer harvesting will be 2015-2035 or so, which means that a huge level of withdrawals are anticipated for this 20-year window.



But alas, someone got to the goodies first. This chart shows how US Federal Debt went from 65% of GDP in 2008 to almost 100% today. That 35-point rise was supposed to be consumed by Boomers seeking to finance their retirement, but now, with debt already so high well before Boomers can get their, the future payouts to Boomers have been crowded out. There is certainly no room for another 35-point rise in Federal Debt as a percentage of GDP (credit downgrades and a capital exodus would happen long before debt could ever reach 135% of GDP), and given that the big debt spike began in 2009, it appears that President Obama and the Democrat Senate have already expended the funds that were supposed to sustain the Boomers.

As debt thresholds that were not meant to be reached until many Boomers were well into their retirement have been pierced ahead of schedule, the squeeze will cause some very ugly intra-Boomer conflicts as each group seeks to secure a portion of the diminished pie, which we will examine later in the article.

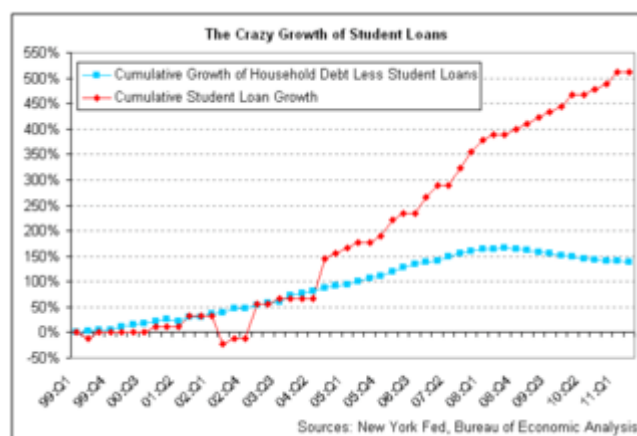


Boomers and Home Equity : But it gets worse for the

Boomers, even for those who have resources that makes them less dependent on Social Security. The housing market has been in a slump (**which I predicted at the very height of the boom in April 2006**), and this will, at best, tread water for the next several years. Ultra-low mortgage rates have merely arrested a further decline, and even that deep well has been fully consumed (chart from **Calculated Risk**, [click to enlarge](#)).

While some Baby Boomers believe they still may have enough time to recoup substantial home equity with which they may seek to finance a portion of their retirement, in order to retain their equity, they need a steady flow of first-time buyers to enter the housing market, in numbers greater than the rate at which retiring Boomers want to sell.

Who are these new first-time buyers? Why, the endless supply of young people starting their careers and forming families, of course. But alas; the many members of this generation, born after 1990, will not be in any position to buy the houses that Boomers are seeking to sell.



To cultivate a new generation of home buyers who can take on a mortgage, it is imperative that they do not already have a mortgage-sized debt before that. But the higher education industry got to this generation before the mortgage industry could, and many members of this generation have already signed away the first several years of their earnings to servicing their student loans in a rapidly inflating bubble (chart from **The Atlantic**, [click to enlarge](#)), amounting to **some \$867 Billion in indebtedness** that is yet to abate. It may be unfortunate that this upcoming generation was unavoidably destined to take on debt, and that it was only a question of whether the student loan industry or the mortgage industry yoked them in first. But it appears that student loans won the race to reach their prey, which is bad news for Boomers seeking to sell their homes in 2015-20.

On top of the student loan burden postponing their home purchases, there are more sinister cultural forces that are moving this upcoming generation towards apartments and condos, and away from the single-family homes that Boomers will seek to sell. The US legal system **severely disincentivizes young men from family formation** by subjecting them to preposterously unfair laws if they enter a modern marital contract, and while those who profit from this status quo have done their best to conceal the risks of marriage and family from young men, **the anti-misandry sphere** continues to expose the truth, particularly to these younger generations of men. Fewer young men are willing to take on the risk of entering such a lopsided contract.

In desperation, Boomers will turn to the last remaining source of new blood - skilled immigration. Skilled immigrants not only do not have student debt to the degree that American youths do, but are usually from countries that have not been ravaged by misandry. **I am strongly in favor of increasing skilled, legal immigration** and will go so far as to say America cannot prosper without it, but even here, Boomers are behind the curve, as by the time this bright idea gets favored, a new generation of skilled foreigners will be far less interested in coming to America than their predecessors in the 1990s and 2000s. The opportunities in India and China are much more than they were in the 1990s when America could attract the very best and brightest in the world. But by 2015, the immigrants America can attract will be diminished in quality and number. So financing their retirements on the backs of skilled immigrants as a substitute for a generation of Americans disincentivized from family formation is a scheme

the Boomers will find to be too little, too late.

If selling their homes at a price that retains some of their home equity was important Baby Boomers, they should have pre-emptively blocked laws that would greatly inhibit family formation and the resultant purchases of single-family homes, among the next generation of Americans. Boomers let this tragedy happen right in front of them, and will pay for it with their home equity.

All Boomers Are Not Equal : Lest you think I am being harsh to Baby Boomers, there is another level of scrutiny here that cannot be exposed often enough. As I have established elsewhere, **70-80% of all government spending is a transfer from men to women**, a default state almost every democracy will revert to over time, and this is especially true of entitlement programs. Since women live 5-7 years longer than men, their average post-65 lifespan is thus about twice as long as a man's. Add to this the fact that **women use more healthcare per year than men anyway**, and we get the heavily unidirectional transfer from men to women that is Medicare.

As it has become apparent that SS and Medicare are not sufficiently funded to meet the needs of Boomers, **many women (in the NYT, no less) are openly rooting for men to die early so that they don't consume the funds that would otherwise be collected by women** (nevermind that the taxes paid into the system were mostly from men). Expect this demand that men die when it is financially optimal for women to become increasingly frequent and shameless. If women are wondering why more and more men don't see the need to put their own well-being behind that of women they don't know, they should contemplate their own contribution to how it has become typical for men to be treated as disposable commodities, rather than human beings.

This is, of course, an opportunity for Boomer men to *finally* fight back. When it is considered acceptable for the mainstream media to say the lives of men are a burden when they have outlived their earning years, and Obamacare, with the power to ration healthcare along political lines, is already prepared to fund women's health at the expense of men's, don't think for a minute that the legislative bias will stop there. An additional surtax on men only, greater defunding of male health procedures, etc. are all being discussed. Perhaps this will finally be enough to provoke a reaction from men.

Conclusion : Overall, the fiscal cliff and non-cooperation of younger Americans and immigrants will bring great calamity to any Baby Boomers with a net worth under \$2 Million. Only the Boomers wealthy enough to not be dependent on either entitlement programs or home equity will go unscathed, and, unless Boomer men start fighting for their rights, they will find that an entire apparatus has been built to minimize their access Social Security and Medicare that they have paid into. At the same time, despite an organized attempt to disenfranchise men, Boomer women will just not be able to extract more than they are already getting, since even the deepest wells of funding will be exhausted given the unprecedented number of women seeking to live off of the state. While the excess spending has been the work of Democrats, **do not think for one minute that Republicans will cut spending even if they win every election they stand in**.

Perhaps this event will be necessary in the process of dismantling many archaic and unjust structures.

Related :

The Housing Bubble : 20-Year Gains May Never Be Repeated

Recessions and Depressions

A First Quarter Poll on The Misandry Bubble

The Futurist · 1 July 2012 · Archived copy · Original

- by Imran Khan

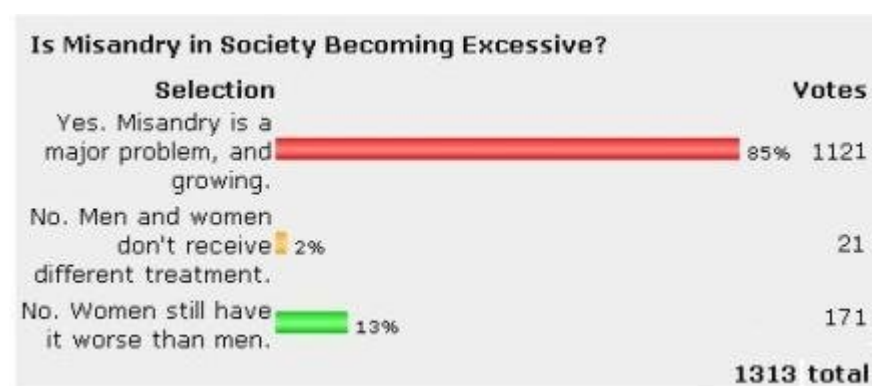
For those who recall, on 1/1/2010, I launched [The Misandry Bubble](#), declaring that the first day of the ten-year series of 201x years during which pervasive societal misandry would be the dominant cultural issue, and how this misandry was itself a bubble that would pop by 2020.

Today, July 1, 2012, is exactly one-fourth into this decade. In the 2.5 years that have elapsed, awareness of misandry has risen greatly, and the number of blogs devoted to shining a light on this has expanded by possibly an order of magnitude.

So at the point of this first-quarter intermission, I am going to post a simple poll, and embed that in the original article as well. The reason I did not include a poll on 1/1/2010 itself was that the concepts introduced in that article were too novel and explosive for average people. But since that time, awareness has risen, and the opposition has become more shrill and extreme. There are still many deniers who refuse to admit that it is even possible for laws to be rigged against men. Thus, a poll today would be more appropriate, with 75% of the decade in question still remaining.

It is true that the first 400,000 visits to [the original article](#) did not have an opportunity to vote in the poll, but the traffic to the article is still quite steady, and starting the poll from this point would still have enough voters.

So here it is (poll closed after 60 days) :



Quite simple. Let us see how the results turn out. For those of you who think there may be a sampling bias among voters, I encourage all of you to post the link of this poll on a misandry-heavy site to even out any such bias (the poll was in fact [posted on DailyKos](#), only for the results to not be nearly as tilted in the favor of 'feminists' as they may have hoped). You will be surprised at how many people are now awake to the pervasive presence of misandry in society.

Poll Closure : It appears that Pollhost took it upon itself to twice delete this 'politically incorrect' poll (even though it is a poll, and hence an aggregate of reader opinions). Fortunately, I saved the results after 60 days, showing a landslide in favor of the view that misandry is for real. At over 6 to 1, the diverse readers of this size recognize misandry to be a real problem.

Here is [yet another poll](#) built around this topic, with similar results from a relatively diverse reader pool.

The Education Disruption : 2015

The Futurist · 23 July 2014 · Archived copy · Original

I was not going to write an article, except that this disruption is so imminent that if I wait any longer, this article would no longer be a prediction. Long-time readers may recall how I have often said that **the more overdue a disruption is, the more sudden it is when it finally occurs, and the more off-guard the incumbents are caught**. We are about to see a disruption in one of the most anti-productivity, self-important, and corrupt industries of them all, and not a moment too soon. High-quality education is about to become more accessible to more people than ever before.

The Natural Progression of Educational Efficiency : The great Emperor Charlemagne lived in a time when even most monarchs (let alone peasants) were illiterate. Charlemagne had a great interest in attaining literacy for himself and fostering literacy on others. But the methods of education in the early 9th century were primitive and books were handwritten, and hence scarce. Despite all of his efforts, Charlemagne only managed to learn to read after the age of 50, and never quite learned how to write. This indicates how hard it was to attain modern standards of basic literacy at the time.

Over time, as the invention of the printing press enabled the mass production of books, literacy became less exclusive over the subsequent centuries, and methods of teaching that could teach the vast majority of six-year-old children how to read became commonplace, delivered en masse via institutions that came to be known as 'schools'.

Since most of us grew up within a mass-delivered classroom model with minimal customization, we consider this method of delivery to be normal, and almost every parent can safely assume that if their child has an IQ above 80 or so, that they will be able to read competently at the right age.

But consider what the Internet age has made available for those who care to take it. I can say with great certainty that the most valuable things I have learned have all been derived from the Internet, free of cost. Whether it was the knowledge that led to new incomes streams, new social capital, or any other useful skills, it was available over the Internet, and that too in just the last decade. Almost every challenge in life has an answer than can be found online. This brings up the question of whether formal schooling, and the immense pricetag associated with it, is still the primary source from which a person can attain the most marketable skills.

Why Education Became an Industry Prone to Attracting Inefficiency : To begin, we first have to address some of the adverse conditioning that most people receive, about what education is, what it should cost, and where it can be obtained. Through centuries of marketing that preys on human insecurity at being left behind, and the tendency to conflate correlation with causation, an immense bubble has inflated over a multi-decade period, and is at its very peak.

Education, which in the bottom 99.9% of classroom settings is really just the transmission of highly commoditized information, has usually correlated to greater economic prospects, especially since, until recently, very few people were likely to overtake the threshold beyond which further education would no longer have a tight correlation to greater earnings. This is why many parents are willing to spare no expense on the education of their children, even to the extent of having fewer children than they might otherwise have had, when estimating the cost of educating them. Exploiting the emotions of parents, the education industry manages to charge ever more money for a product that is often declining in quality, with surprisingly little questioning from their customers. We are so accustomed to this unrelenting rise in costs at all levels of education that few people realize how highly perverse it is.

Glenn Reynolds of Instapundit, with his books '**The Higher Education Bubble**' and '**The K-12 Implosion**', has been the earliest and most vocal observer of a bubble in the education industry. The vast corruption and sexual misconduct by faculty in K-12 public schools is described in the latter of those two books, but over here, we will focus mostly on higher education.

Among the dynamics he has described are how government subsidization of universities directly as well as of

student loans enables universities to increase fees at a rate that greatly outstrips inflation, which in turn allows universities to hire legions of non-academic staff, many of whom exist only to politicize the university experience and further the goals of politicians and government bureaucrats.

[image]As a result, university degrees have gotten more expensive, while the salaries commanded by graduates have remained flat or even fallen. The financial return of many university degrees no longer justifies their cost, and this is true not just of Bachelor's Degrees, but even of many MBA and JD degrees from any school ranked outside the Top 10 or even Top 5.

Graduates often have as much as \$200,000 in debt, yet have difficulty finding jobs that pay more than \$50,000 a year. Student loan debt has tripled in a decade, even while many universities now see no problem in departing from their primary mission of education, and have drifted into a priority of ideological brainwashing. Combine all these factors, and you have a generation of young people who may have student debt larger than the mortgage on a median American house (meaning they will not be the first-time home purchasers that the housing market depends on to survive), while having their head filled with indoctrination that carries zero or even negative value in the private sector workforce.

When you combine this erosion of value with the fact that it now takes just minutes to research a topic, from home and at any hour, that previously would have involved half a day at the public library, why should the same sort of efficiency gain not be true for more formal types of education that are actually becoming scarcer within universities?

Primed For Creative Destruction : Employers want skills, rather than credentials. There may have been a time when a credential had a tight correlation with a skillset that an employer sought in a new hire, but that has weakened over time, given the dynamic nature of most jobs, and the dilution of rigor in attaining the credential that most degrees have become. Furthermore, technology makes many skillsets obsolete, while creating openings for new ones. With the exception of those with highly specialized advanced degrees, very few people over the age of 30 today, can say that the demands of their current job have much relevance to what they learned in college, or even what computing, productivity, and research tools they may have used in college. Furthermore, anyone who has worked at a corporation for a decade or more is almost certainly doing a very different job than the one they were doing when they were first hired.

Hence, the superstar of the modern age is not the person with the best degree, but rather the person who acquires the most new skills with the greatest alacrity, and the person with the most adaptable skillset. A traditional degree has an ever-shortening half-life of relevance as a person's career progresses, and even fields like Medicine and Law, where one cannot practice without the requisite degree, will not be exempt from this loosening correlation between pedigree and long-term career performance. Agility and adaptability will supercede all other skillsets in the workforce.

Google, always leading the way, **no longer mandates college degrees as a requirement**, and has recently disclosed that about 14% of its employees do not have them. If a few other technology companies follow suit, then the workforce will soon have a pool of people working at very desirable employers, who managed to attain their position without the time and expense of college. If employers in less dynamic sectors still have resistance to this concept, they will find it harder to ignore the growing number of resumes from people who happen to be alumni of Google, despite not having the required degree. As change happens on the margins, it will only take a small percentage of the workforce to be hired by prestigious employers.

The Disruption Begins at the Top : Since this disruption is technological and almost entirely about software, perhaps the disruption has to originate where the people most directly responsible for the disruption exist. The program that has the potential to slash the costs of entry into a major career category is an online **Master of Science in Computer Science (MSCS) degree through a collaboration between the Georgia Institute of Technology, Udacity, and AT&T**. For an estimated cost of just \$6700, this program can enroll 10,000 geographically dispersed students at once (as opposed to the mere 300 MSCS degrees per year that Georgia Tech was awarding previously).

This is a tremendous revolution in terms of both cost and capacity. A degree that can make a graduate eligible for high-paying jobs in a fast-growing field, is now accessible to anyone with the ability to succeed in the program. The implications of this are immense.

For one thing, this profession, which happens to be one with possibly the fastest-growing demand, has itself found a way to greatly increase the influx of new contributors to the field. *By removing both cost and geographical location, the program competes not just with brick and mortar MSCS programs, but with other degrees as well.* Students who may have otherwise not considered Computer Science as a career at all, may now choose it simply due to the vastly lower cost of preparation relative to similarly high-paying careers like other forms of engineering, law, or medicine. Career changers can jump the chasm at lower risk than before, for the same reasons.

As fields similarly suitable to remote learning (say, systems engineering, mathematics, or certain types of electrical engineering) see MOOC degree programs created for them, more avenues open up. Fields where education can be more easily transmitted to this model will see an inherent advantage over fields that cannot be learned this way, in terms of attracting talent. These fields in turn grow in size, becoming a larger portion of the economy, and creating even more demand for new entrants above a certain competence threshold.

But these fields are still not the 'top' echelon of professional excellence. The profession that is the most widespread, most dynamic, most durable, and has created the greatest wealth, is one that universities almost never do a good job of teaching or even discussing : that of entrepreneurship. *I have stated before that the ever-increasing variety of technological disruption means that the foremost career of the modern era is that of the serial entrepreneur.* If universities are not the place where the foremost career can be learned, then how important are formal degrees from these universities? Since each entrepreneurial venture is different, the individual will have to synthesize a custom solution from available components.

Multi-Faceted Disruption : As *The Economist* has noted, *MOOCs have not yet unleashed a 'gale of Schumpeterian creative destruction'* onto universities. But this is still a conflation of the degree and the knowledge, particularly when the demands of the economy may shift many times during a person's career. *Udacity, Coursera, MITx, Khan Academy, and Udemy* are just a few of the entities enabling low-cost education at all levels. Some are for-profit, some are non-profit. Some address higher education, and some address K-12 education. Some count as credit towards degrees, and some are not intended for degree-granting, but rather for remedial learning. But among all these websites, an innovative pupil can learn a variety of seemingly unrelated subjects and craft an interlocking, holistic education that is specific to his or her goals.

When the sizes and shapes of education available online has so much variety, many assumptions about who has what skills will be challenged. There will be too many counterexamples against the belief that a certain degree qualifies a person for a certain job. Furthermore, the standardization of resumes and qualifications that the paradigm of degrees creates has gone largely unchallenged. People who are qualified in two or more fields will be able to cast a wider net in their careers, and entrepreneurs seeking to enter a new market can get up to speed swiftly.

Scale to the Topmost Educators : There was a time when music and video could not be recorded. Hundreds of orchestras across a nation might be playing the same song, or the same play might be performed by hundreds of thespians at the same time. Recording technologies enabled the most marketable musicians and actors to reach millions of customers at once, benefiting them and the consumer, while eliminating the bottom 99% of workers in these professions. Consumers and the best producers benefitted, while the lesser producers could no longer justify their presence in the marketplace and had to adapt.

The same will happen to teachers. It is not efficient for the same 6th-grade math or 8th grade biology to be taught by hundreds of thousands of teachers across the English-speaking world each year. Instead, technology will enable scale and efficiency. The best few lectures will be seen by all students, and it is quite possible that the best teacher, as determined by market demand, earns far more than one currently thinks a teacher can earn. The rise of the 'celebrity teacher' is entirely possible, when one considers the disintermediation and concentration that has already

happened with music and theatrical production. This sort of competition will increase quality that students receive, and ensure remuneration is more closely tied to teacher caliber.

Conclusion : It is not often that we see something experience a dramatic worsening in cost/benefit ratio while competitive alternatives simultaneously become available at far lower costs than just a few years prior. When a status quo has existed for the entire adult lifetime of almost every American alive today, people fail to contemplate the peculiarity of spending as much as the cost of a house on a product of highly variable quality, very uncertain payoff, and very little independent auditing. The degree of outdatedness in the assumption that paying a huge price for a certain credential will lead to a certain career with a certain level of earnings means the edifice will topple far more quickly than many people are prepared for.

2015 is a year that will see the key components of this transformation fall into place. Some people will be enter the same career while spending \$50,000 less on the requisite education, than they may have expected. Many colleges will shrink their enrollments or close their doors altogether. The light of accountability will be shone on the vast corruption and ideological extremism present in some of the most expensive institutions (**Moody's has already downgraded the outlook of the entire US higher education industry**). But most importantly, the most valuable knowledge will become increasingly self-taught from content available to all, and the entire economy will begin the process of adjusting to this new reality.

See Also :

The Carnival of Creative Destruction

Two Overdue Technologies About to Arrive

The Futurist · 21 December 2014 · Archived copy · Original

The rate of technological change has been considerably slower than its trendline ever since the start of the 21st century. I wrote about this back in 2008, but at the time, I did not have quite as advanced techniques of observing and measuring the gap between the rate of change and the trendline, as I do now.

The dot-com bust coincided with a trend toward lower nominal GDP (since everyone wrongly focuses on 'real' GDP, which has less to do with real-world decisions than nominal GDP), and this has led to technological change, despite sporadic bursts, generally progressing at what is currently only 60-70% of its trendline rate. For this reason, many technologies that seemed just 10 years away in 2000, have still not arrived as of 2014. I will write much more on this at a later date.

But for now, two overdue technologies are finally plodding towards where many observers thought they would have been by 2010. Nonetheless, they are highly disruptive, and will do a great deal to change many industries and societies.

1) Artificial Intelligence :

A superb article by Kevin Kelly in Wired Magazine describes how three simultaneous breakthroughs have greatly accelerated the capabilities of Artificial Intelligence (AI). Most disruptions are usually the result of two or more seemingly unrelated technologies both crossing certain thresholds, and observers tend to be surprised because each group of observers was following only one of the technologies. For example, the iPod emerged when it did because storage, processing, and the ability to store music as software all reached certain cost, size, and power consumption limits at around the same time.

What is interesting about AI is how it can greatly expand the capabilities of those who know how to incorporate AI with their own intelligence. The greatest chess grandmaster of all time, Magnus Carlsen, became so by training with AI, and it is unclear that he would have become this great if he lived before a time when such technologies were available.

The recursive learning aspect of AI means that an AI can quickly learn more from new people who use it, which makes it better still. One very obvious area where this could be used is in medicine. Currently, millions of MD general practitioners and pediatricians are seen by billions of patients, mostly for relatively common diagnostics and treatments. If a single AI can learn enough from enough patient inputs to replace most of the most common diagnostic capabilities of doctors, then that is a huge cost savings to patients and the entire healthcare system.

Some doctors will see their employment prospects shrink, but the majority will be free to move up the chain and focus on more serious medical problems and questions.

Another obvious use is in the legal system. On one hand, while medicine is universal, the legal system of each country is different, and lawyers cannot cross borders. On the other hand, the US legal system relies heavily on precedent, and there is too much content for any one lawyer or judge to manage, even with legal databases. An AI can digest all laws and precedents and create a huge increase in efficiency once it learns enough. This can greatly reduce the backlog of cases in the court system, and free up judicial capacity for the most serious cases.

The third obvious application is in self-driving cars. Driving is an activity where the full range of possible traffic situations that can arise is not a particularly huge amount of data. Once an AI gets to the point where it analyzes every possible accident, near-accident, and reported pothole, it can easily make self-driving cars far safer than human driving. This is already being worked on at Google, and is only a few years away.

Get ready for AI in all its forms. While many jobs will be eliminated, this will be exceeded by the opportunity to add AI into your own life and your own capabilities. Make your IQ 40 points higher than it is when you need it most, and your memory thrice as deep - all will be possible in the 2020s for those who learn to use these

capabilities. In fact, being able to augment your own marketable skills through the use of AI might become one of the most valuable skillsets for the post-2025 workforce.

2) Virtual Reality/Augmented Reality :

Longtime readers recall [that in 2006, I correctly predicted that by 2012-13, video games would be a greater source of entertainment than television](#). Now, we are about to embark on the next phase of this process, as a technology that has had many false starts for over 20 years might finally be approaching reality.

Everyone knows that the Oculus Rift headset will be released to the consumer in 2015, and that most who have tried it has had their expectations exceeded. It supposedly corrects many of the previous problems of other VR/AR technologies that have dogged developers for two decades, and has a high resolution.

But entertainment is not the only use for a VR/AR headset like the Oculus Rift, for the immersive medium that the device facilitates has tremendous potential for use in education, military training, and all types of product marketing. Entirely new processes and business models will emerge.

One word of caution, however. My decade of direct experience with running a large division of a consumer technology company compels me to advise you not to purchase any consumer technology product until it is in its third generation of consumer release, which is usually 24-48 months after initial release. The reliability and value for money are usually not compelling until Gen three. Do not mistake fractional generations (i.e. 'version 1.1', or 'iPhone 5, 5S, and 5C) for actual generations. The Oculus Rift may be an exception to this norm (as are many Apple products), but in general, don't be an early adopter on the consumer side.

Update (5/27/2016) : [The same Kevin Kelly has an equally impressive article about VR/AR](#).

Combining the Two :

Imagine, if you would, that the immersive movies and video games of the near future are not just fully actualized within the VR of the Oculus Rift, but that the characters of the video game adapt via connection to some AI, so that game characters far too intelligent to be overcome by hacks and cheat codes emerge.

Similarly, imagine if various forms of training and education are not just improved via VR, but augmented via AI, where the program learns exactly where the student is having a problem, and adapts the method accordingly, based on similar difficulties from prior students. Suffice it to say, both VR and AI will transform medicine from its very foundations. Some doctors will be able to greatly expand their practices, while others find themselves relegated to obsolescence.

Two overdue technologies, are finally on our doorstep. Make the most of them, because if you don't, someone else surely is.

Related :

[The Next Big Thing in Entertainment](#)

[Timing the Singularity](#)

[The Impact of Computing : 78%/year](#)

The End of Petrotyranny - Victory

The Futurist · 8 March 2016 · Archived copy · Original

I refer readers back to an article written here in 2011, titled '[The End of Petrotyranny](#)', where I claimed that high oil prices were rapidly burning through the buffer that was shielding oil from technological disruption. I quantified the buffer in an equation, and even provided a point value to how much of the buffer was still remaining at the time.

I am happy to declare a precise victory for this prediction, with oil prices having fallen by two-thirds and remaining there for well over a year. While hydraulic fracturing (fracking) turned out to be the primary technology to bring down the OPEC fortress, other technologies such as photovoltaics, batteries, and nanomaterials contributed secondary pressure to the disruption. The disruption unfolded in accordance with the 2011 Law of Finite Petrotyranny :

From the start of 2011, measure the dollar-years of area enclosed by a chart of the price of oil above \$70. There are only 200 such dollar-years remaining for the current world petro-order. We can call this the 'Law of Finite Petrotyranny'.

Go to the [original article](#) to see various scenarios of how the dollar-years could have been depleted. While we have not used up the full 200 dollar-years to date, the range of scenarios is now much tighter, particularly since fracking in the US continues to lower its breakeven threshold. At present, over \$2T/year that was flowing from oil importers to oil producers, has now vanished, to the immense benefit of oil importers, which are the nations that conduct virtually all technological innovation.

The 2011 article was not the first time this subject of technological pressure rising in proportion to the degree of oil price excess has been addressed here at The Futurist. There were prior articles in [2007](#), as well as [2006 \(twice\)](#).

As production feverishly scales back, and some of the less central petrostates implode, oil prices will gradually rise back up, generally saturating at the \$70 level ([itself predicted in 2006](#)) in order to deplete the remaining dollar-years. But we may never again see oil at such a high price relative to world GDP, as existed from most of 2007-14 (oil would have to be \$200+/barrel today to surpass the record of \$147 set in 2008, in proportion to World GDP).

The Technological Progress of Video Games, Updated

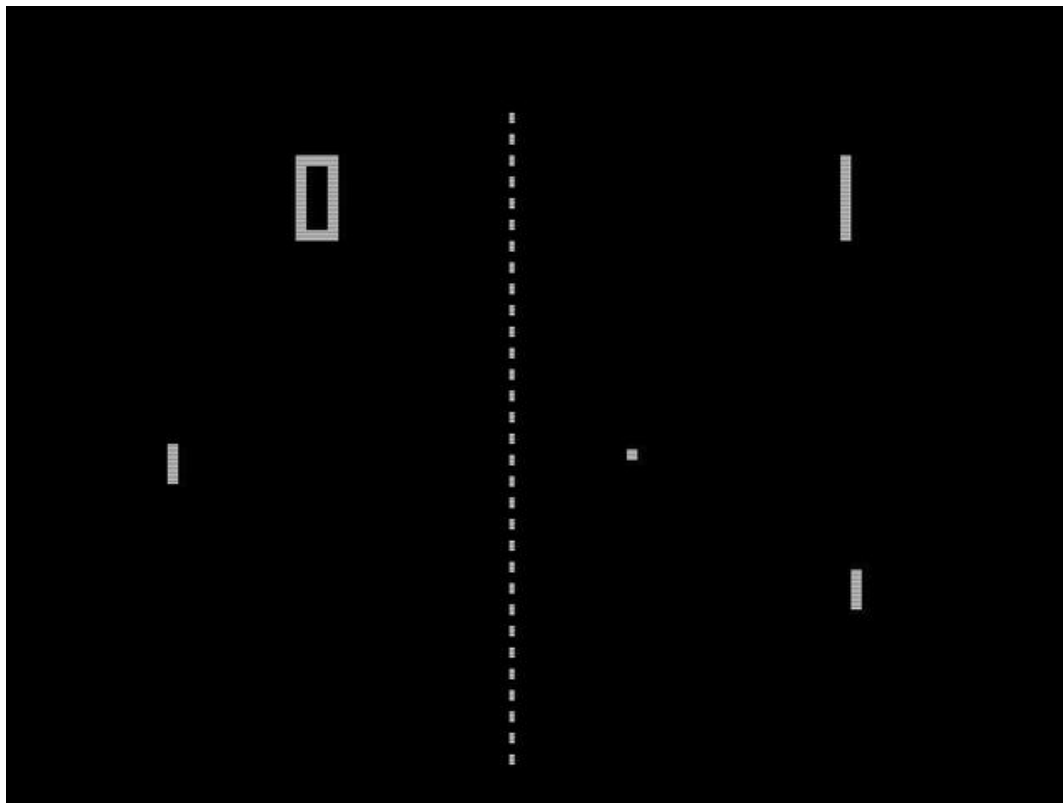
The Futurist · 1 April 2016 · Archived copy · Original

A decade ago, in the early days of this blog, [we had an article tracking video game graphics at 10-year intervals](#). As per that cadence, it is time to add the next entry to the progression.

The polygons in any graphical engine increase as a square root of Moore's Law, so the number of polygons doubles every three years.

Sometimes, pictures are worth thousands of words :

1976 :



1986 :



1996 :



2006 :



I distinctly remember when the 2006 image looked particularly impressive. But now, it no longer does. This inevitably brings us to...

2016 (an entire video is available, with some gameplay footage) :

This series illustrates how progress, while not visible over one or two years, accumulates to much more over longer periods of time.

Now, extrapolating this trajectory of exponential progress, what will games bring us in 2020? or 2026?

Additionally, note that screen sizes, screen resolution, and immersion (e.g. VR goggles) have risen simultaneously.

Changes

The Futurist · 15 May 2016 · Archived copy · Original

It is the end of an era here at The Futurist. As long-time readers know, this has been a blog of **two individual bloggers** who did not distinguish themselves from each other. This was a worthwhile experiment at the inception of the website in early 2006. But now, the goals have changed. The technology blogger will be the primary blogger here, taking a slightly different direction for this site. The political blogger has, for the most part, retired from blogging, and has discontinued participation in some of his other online communities (such as anti-misandry).

The technology blogger has been working on a related project of much more comprehensive scope, and will be linking it here to The Futurist. Hence, this blog will be primarily devoted to technological and economic topics, with very little political content going forward. Both bloggers will write under their real names.

From Imran Khan (the political blogger) :

Many of my fans from the anti-misandry sphere have wondered why I drifted away from there in 2014. Well, it was a combination of several factors :

1) My Work There Was Done : The predictions in **The Misandry Bubble** were solidified and part of the DNA of the 'androsphere'. Existing bloggers keep up with current events and parse the news through the anti-misandry filter, but my contribution was just comments, after **The Misandry Bubble** over 6 years ago. Over time, much of the content in the androsphere trends toward repetition. When 2020 arrives, we will do an assessment scorecard of the predictions made a decade prior.

2) Not Enough Activism : Anti-misandry ideas have spread to the mainstream through the effort of some great bloggers (like **Dalrock** and **PM/AFT**). But too many of the other participants do far too little beyond Internet commenting. I mentioned this in **The Misandry Bubble** about 'Why There is no Men's Rights Movement', and this continues to be true. **I even invented a strategy and campaign** uniquely tailored to operate within the constraints of anonymity, cost, and decentralization that were needed for any real Men's Rights Activism, but only half a dozen men did the legwork despite everyone hailing it as highly effective. To this day, there is minimal activism beyond about five key people, while far smaller causes immediately manage to get the apparatus of activism established.

3) Too Much Infighting : The blogs I commented at do an admirable job of attracting and keeping civil commenters. But elsewhere, some major figure in the androsphere is in an acrimonious battle with another almost every month. The reasons are usually just poor communication between the two parties. For a community of just 300 or so active participants that is up against an evil that outnumbers and outspends them by a ratio of several million to one, there is too much wasteful infighting among people who agree on 90% of their views. Such a 'movement' makes little real movement.

4) Too Much Anger Towards Average Women : As **The Misandry Bubble** states, the hierarchy of misandric zeal is **Hardcore 'Feminist' > Mangina > Average Woman**. The average woman does not seethe with a desire to harm any and all males the way a full-time 'feminist' does. The average woman just wants to side with whoever is winning, which is an evolutionary mechanism that helped women survive. I always maintained that ordinary women were being harmed by 'feminism' just as much as ordinary men, since what average women value most has been taken away from them by 'feminists'. As I have maintained, it is impossible to harm one gender without harming the other.

Some parts of the 'sphere have too much anger towards average women, and too little towards the sleazy men who think groveling to 'feminists' will improve their social status. These 'manginas' are universally hated by normal men, normal women, and even hardcore 'feminists', yet do most of the heavy-lifting that keeps the hate-cult going. If there is an Achilles heel that can be attacked to bring the edifice down, it is these manginas. The inability of Men's Rights to focus on the weakest target ensures a lack of progress. Speaking of

manginas....

5) Too Many Neo-Nazis : The androsphere has been infested by a strain of Neo-Nazis (describing themselves as 'white nationalists') who are both racial supremacists and economic leftists. Their views are wrong on both of those counts, but that is not even the worst thing about them. They are antithetical to the notion of Men's Rights since they believe that a woman of their race is far more valuable than a man, to the extent of being a goddess. It is apparent that any ethno-centric ideology will default to an obsession with fertility rates, and since women are the scarcer reproductive resource, **such ideologies invariably become nothing more than fertility goddess cults**. This is true, of course, of any ethno-centric ideology, not just whites. In fact, it is a testament to white maturity that 'white nationalists' never get any real traction among their own population. This is precisely *why* whites are successful - they do a better job marginalizing their own degenerates than other groups do.

My debates with the Neo-Nazis were funny. I would routinely point out that 90% of American whites are just not racist, and they would counter that they indeed are, contrary to my observation. In other words, I would insist that their group is *not* racist, which they see as a bad thing (as it explains their poor recruitment), leading them to insist that more whites *are*. And I am not just brown, but a Muslim too.

Remember that 'white nationalism' recruits only the least successful white men, almost entirely due to their desire to obstruct a white woman's choice to date outside her race. This is leftist protectionism demanded by uncompetitive actors, nothing more. The coup de grace I apply in such debates is to point out that there is almost zero female participation in 'white nationalism', despite it being an ideology wholly dependent on white women having more babies. The hilarity of an ideology built around higher reproduction nonetheless finding itself to be 98-99% male is self-evident. Women have a natural radar that steers them away from loserdom, and manginas (whether general or Neo-Nazi) always create this effect.

Since the ideologies of Neo-Nazis and 'feminists' have substantial overlap, Men's Rights cannot advance without a purge of these Neo-Nazis. Over time, this purge will happen, but my time is better spent elsewhere.

6) The Futurist has a Different Destiny : My technology co-blogger has created something of grand purpose, something so profound that it has a higher significance. It is valuable enough that this website should be devoted exclusively to it, without tangential distractions, given that he is more of a political moderate than I.

For these reasons, my participation in the androsphere has drawn to a close. The Misandry Bubble will remain where it is, but it should be seen as a time capsule of predictions, to be opened 10 years hence from original publication.

Introducing 'The ATOM'

The Futurist · 28 June 2016 · Archived copy · Original

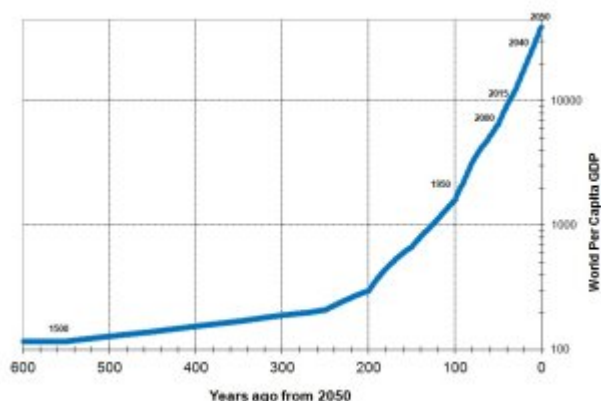
I am unveiling 'The ATOM', a 14-chapter e-book that contains novel concepts, research, and policy prescriptions about the various effects of technological progress on the economy and society. You can go over to [the e-book](#) and start reading and commenting there. Blog posts on The Futurist will now be related to ATOM-affiliated concepts.

The e-book is published in blog format, so that comments can accrue underneath each chapter, and future blog posts can link to specific parts of the e-book. Videos at the start of each chapter serve as summaries for those who do not wish to read a wall of text in order to get a synopsis. Go over there and read it, chapter by chapter, up and down. You will never see the world quite the same way again.



Economic Growth is Exponential and Accelerating, or is it?

The Futurist · 4 July 2016 · Archived copy · Original



Chapter 2 of the ATOM e-book addresses the centuries-old accelerating trendline of economic growth. Recall that this was the topic of an article of mine almost exactly 9 years ago as well.

However, there may be more nuances to this concept than previously addressed. It may be that since GDP is a human construct, it only happens to be correlated to the accelerating rate of change by virtue of humans being the forefront of advancing intelligence. It could be that once artificial intelligence can advance without human assistance, most types of technology that improve human living standards may stagnate, since the grand goal of propagating AI into space is no longer bottlenecked by human progress. Humans are certainly not the final state of evolution, as evidenced by the much greater suitability of AI for space exploration (AI does not require air or water, etc.).

That is certainly something to think about. Human progress may only be on an accelerating curve until a handoff to AI is completed. After that, metrics quite different than GDP may be the best to measure progress, as the AI perhaps only cares about computational density, TERAFL0Ps, etc.

Tesla's Rapid Disruption

The Futurist · 12 July 2016 · Archived copy · Original

MIT Technology Review has an article describing how Tesla Motors has brought rapid disruption to the previously staid auto industry, where there are too many factors precluding the entry of new companies. But this is nothing new for readers of The Futurist, as I specifically identified Tesla as a key candidate for disruption way back in 2006. In Venture Capital terms, this was an exceptionally good pick such an early stage.

In ATOM terms, the progress of Tesla is an example of everything from how all technological disruptions are interlinked, to how each disruption is deflationary in nature. It is not just about the early progress towards electric cars, removal of the dealership layer of distribution, or the recent erratic progress of semi-autonomous driving.

Among other things, Tesla has introduced lower-key but huge innovations such as remote wireless software upgrades of the customer fleet, which itself is a paradigm shift towards rapidly-iterating product improvement. In true ATOM form, the accelerating rate of technological change is beginning to sweep the automobile along with it.

When Tesla eventually manages to release a sub-\$35,000 vehicle, the precedents set in dealership displacement, continual wireless upgrades, and semi-autonomous driving will suddenly all be available across hundreds of thousands of cars, surprising unprepared observers but proceeding precisely along the expected ATOM trajectory.

Bond Yields Continue to Confirm ATOM Revelations

The Futurist · 17 July 2016 · Archived copy · Original

U.S. 10-Year Bond Yield Overview



The US 10-Year Treasury Yield is now just 1.55% and dropping. Despite US QE (which has not been at a full \$85B/month since 2013), this is evidence of future expectations of very little inflation.

My research for the ATOM has revealed that pervasive technological disruption is the reason for this structurally declining inflation. Failure to recognize that this technological force is permanent and rising exponentially is the reason 'experts' are baffled as to where all the central bank money is going, and reforms towards a revamp of central bank monetary easing is not being discussed. Remember that this fall in yield is across all countries with significant technology density. German and Japanese 10-year bond yields are almost 0%.

US Real Estate received a decades-long boost from lowering mortgage rates as long-term bond yields fell. Few question how homes that used to be 2.5 times the household income of the area are now priced at 10 times the household income or higher. With yields getting this low, and with property taxes now as large a contributor to home ownership costs as the mortgage payment, how much higher can home prices go? How much of US GDP is dependent on not merely high, but *rising* home prices?

Related ATOM chapters :

3. Technological Disruption is Pervasive and Deepening
4. The Overlooked Economics of Technology
6. Current Government Policy Will Soon be Ineffective

Artificial Intelligence Finally Disrupting Medicine

The Futurist · 14 August 2016 · Archived copy · Original

The best news of the last month was something that most people entirely missed. Amidst all the distractions and noise that comprises modern media, a quiet press release discloses that a supercomputer has suddenly become more effective than human doctors in diagnosing certain types of ailments.

IBM's Watson correctly diagnoses a patient after doctors are stumped.

This is exceptionally important. As previously detailed in **Chapter 3 of The ATOM**, not only was a machine more competent than an entire *group* of physicians, but the machine continues to improve as more patients use it, which in turn makes it more attractive to use, which enables the accrual of even more data upon which to improve further.

But most importantly, a supercomputer like Watson can treat patients in hundreds of locations in the same day via a network connection, and without appointments that have to be made weeks in advance. Hence, such a machine replaces not one, but hundreds of doctors. Furthermore, it takes very little time to produce more Watsons, but it takes 30+ years to produce a doctor from birth, among the small fraction of humans with the intellectual ability to even become a physician. The economies of scale relative to the present doctor-patient model are simply astonishing, and there is no reason that 60-80% of diagnostic work done by physicians cannot soon be replaced by artificial intelligence. This does not mean that physicians will start facing mass unemployment, but rather than the best among them will be able to focus on more challenging problems. The most business-minded of physicians can incorporate AI into their practice to see a greater volume of patients on more complicated ailments.

This is yet another manifestation of various **ATOM principles**, from technologies endlessly crushing the cost of anything overpriced, to self-reinforcing improvement of deep learning.

Related : **Eight paraplegics take their first step in years, thanks to robotics.**

Related ATOM Chapters :

3. Technological Disruption is Pervasive and Deepening

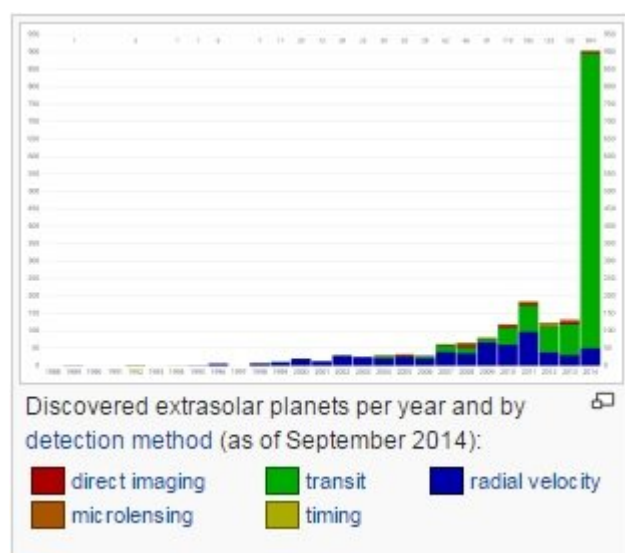
4. The Overlooked Economics of Technology

New Telescopes to Reveal Untold Wonders

The Futurist · 28 August 2016 · Archived copy · Original

A number of new telescopes are soon going to be entered into service, all of which are far more powerful than equivalent predecessors. This is fully expected by any longtime reader of The Futurist, for space-related articles have been a favorite theme here.

To begin, refer to the vintage 2006 article where I estimated telescope power to be rising at a compound annual rate of approximately 26%/year, although that is a trendline of a staircase with very large steps. This, coincidentally, is exactly the same rate at which computer graphics technology advances, which also happens to be the square root of Moore's Law's rate of progress. According to this timeline, a wave of powerful telescopes arriving now happens to be right on schedule. Secondly, refer to one of the very best articles on The Futurist, titled 'SETI and the Singularity', where the impact of increasing telescopic power is examined. The exponential increase in the detection of exoplanets (chart from Wikipedia), and the implications for the Drake Equation, are measured, with a major prediction about extraterrestrial life contained therein.



Building on that, in the ATOM e-book, I detail how accelerating technological progress has a major impact on space exploration. Contrary to a widely-repeated belief that space exploration has plateaued since the Apollo program, technology has ensure that quite the opposite is true. Exoplanet detection is now in the hundreds per year (and soon to be in the thousands), even as technologies such as 3D Printing in space and asteroid mining are poised to generate great wealth here on Earth. With space innovation no longer exclusively the domain of the US, costs have lowered through competition. India has launched a successful Mars orbiter at 1/10th the cost of equivalent US or Russian programs, which has been in operation for two years.

Related ATOM Chapters :

3. Technological Disruption is Pervasive and Deepening

12. The ATOM's Effect on the Final Frontier

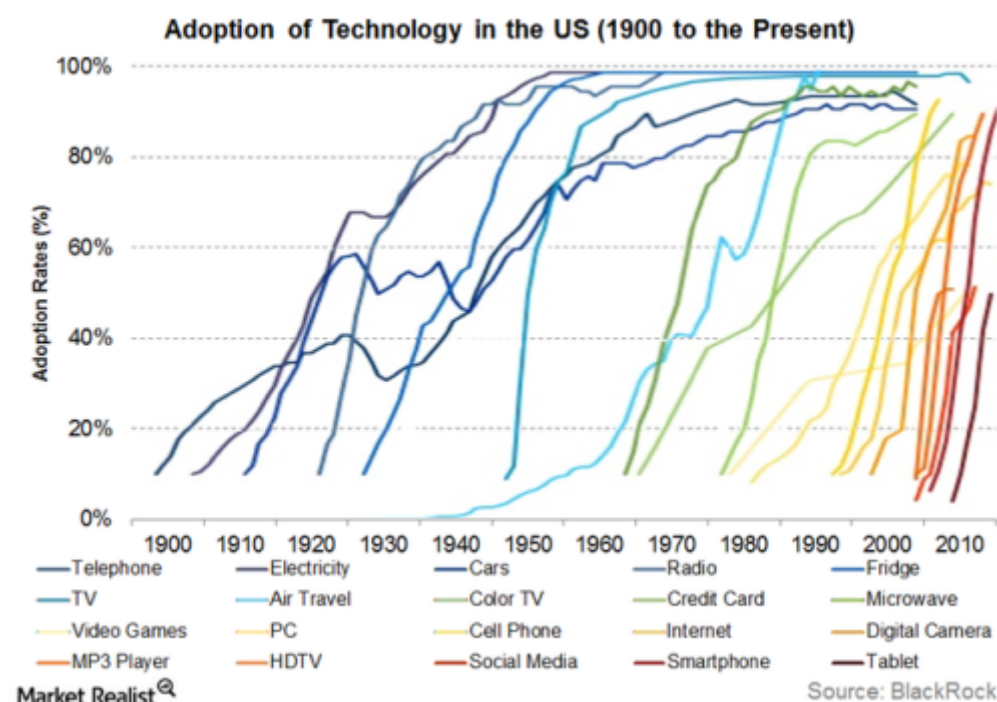
Invisible Disruptions : Deep Learning and Blockchain

The Futurist · 13 September 2016 · Archived copy · Original

In the [ATOM e-book](#), we examine how technological disruption can be measured, and how the aggregate disruption ongoing in the world at any given time continues along a smooth, exponentially rising trendline. Among these, certain disruptions are invisible to most onlookers, because a tangential technology is simultaneously disrupting seemingly unrelated industries from an orthogonal direction. In that vein, here are two separate lists of industries that are being disrupted, one by Deep Learning and the other by Blockchain.

13 Industries Using Deep Learning to Innovate.

20 Industries that Blockchain could Disrupt



Note how many industries are present in both of the above lists, meaning that the sectors have to deal with compound disruptions from more than one direction.

In addition, we see that sectors where disruption was artificially thwarted due to excessive regulation and government protectionism merely see a sharper disruption, higher up in the edifice. When the disruption arrives through abstract technologies such as Deep Learning and Blockchain, the incumbents are unlikely to be able to thwart it, due to the source of the disruption being effectively invisible to the untrained eye. What is understood by very few is that the accelerating rate of adoption/diffusion, depicted in this chart here from Blackrock, is enabled by such orthogonal forces that are not tied to any one product category or even industry.

Related ATOM Chapters :

[Technological Disruption is Pervasive and Deepening](#)

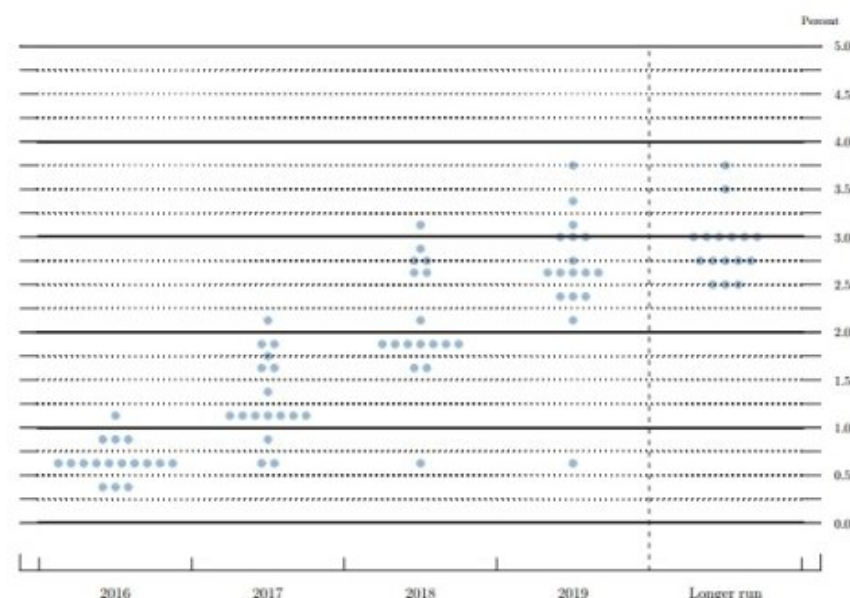
[The Overlooked Economics of Technology](#)

The Federal Reserve Continues to Ignore Technological Deflation

The Futurist · 22 September 2016 · Archived copy · Original

For release at 2:00 p.m., EDT, September 21, 2016

Figure 2. FOMC participants' assessments of appropriate monetary policy: Midpoint of target range or target level for the federal funds rate



The recent FOMC meetings

continue to feature a range of debate only around the rate at which the Fed Funds rate can be increased up to about 4% (which has not coincided with a robust economy since the late 1990s). They actually describe this as a 'normal' rate, and the process of raising the rate as 'normalization'. The 'Dot Plot' pictured here indicates the paradigm that the Federal Reserve still believes. Even the most 'dovish' members still think that the Fed Funds rate will be above 2% by 2019.

This is dangerously inaccurate. At the start of 2016, the Federal Reserve expected that they will do four rate likes this year itself. Now they are down to an expectation of just two (one more than the one early in this year), and may just halt with one. How can a collection of supposedly the best and wisest economic forecasters be so consistently wrong? A 20% stock market correction will lead to a swift rate reversal and a 25%+ correction will lead to a resumption of QE in excess of \$100B/month.

As we can see in the [ATOM e-book](#), technological deflation is endless and exponentially increasing, and hence the Wu-Xia shadow rate indicates the natural Fed Funds rate for the US to be around the equivalent -2%. Yes, minus two percent, achieved through the various rounds of QE that have been done to date in order to simulate a negative interest rate. The US stopped its QE in 2014, but continues to be held afloat by a portion of the \$220B/month of worldwide central bank easing that flows into the US. **This is barely enough to keep US Nominal GDP (NGDP) growth at 3%**, which is far below the level at which innovation can proceed at its trendline rate. *The connection between technological progress, technological deflation, and worldwide central bank action is still not being discovered by decision-makers.*

The -2% indicated by the Wu-Xia shadow rate might be as deep as -4% by 2025, under current trends of technological diffusion. The worldwide central bank easing required to halt deflation by that time will be several times higher than today. **As per the ATOM policy reform recommendations**, this can be an exceptionally favorable thing if the fundamentals are recognized.

For the full analysis and thesis, read the [ATOM e-book](#).

Related ATOM Chapters :

- 4. [The Overlooked Economics of Technology](#)
- 6. [Current Government Policy Will Soon Be Ineffective](#)
- 7. [Government Policies Must Adapt, and Quickly](#)
- 10. [Implementation of the ATOM Age for Nations](#)

Why Do Job Searches Take Longer Than 30 Years Ago?

The Futurist · 13 November 2016 · Archived copy · Original



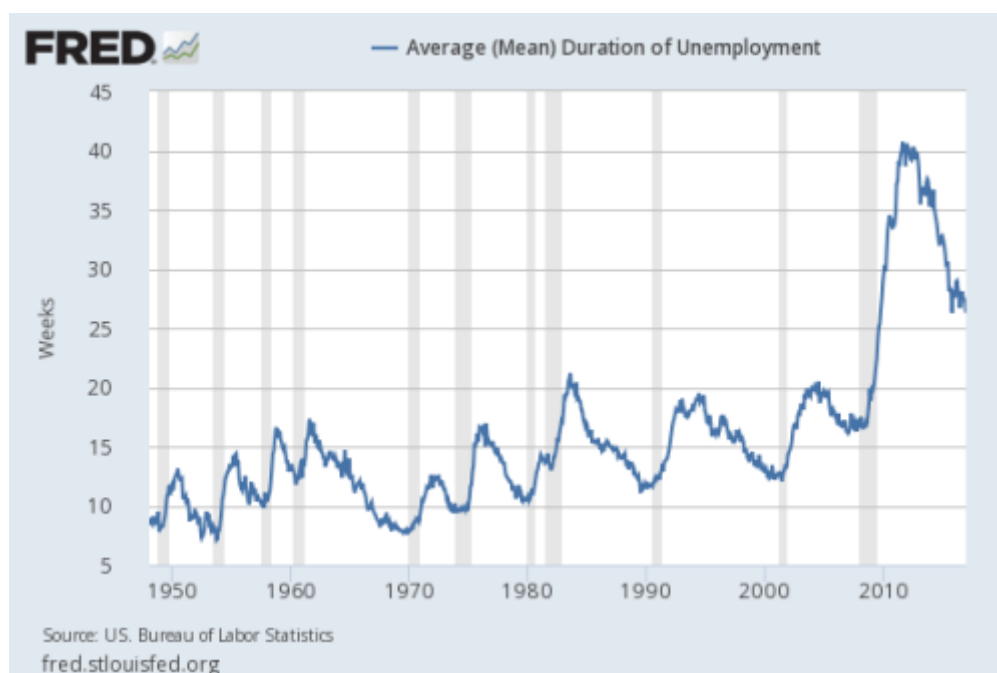
I have recently come into contact with a few professionals in transition, many from the now-shrinking big semiconductor companies. In speaking to them, one thing that stood out is how it takes them 9-12 months or more to secure a new position.

Why is this the case, in an age of accelerating technological progress, as per the **ATOM**? This is an instance of where culture has prevented the adoption of a solution that is technologically feasible.

Where Cultural Inertia Obstructs Technology : Before the Internet age, if you wanted to research a subject, you had to go to the library, spend hours there, check out some books, and go back home. Overall, this consumed half a day, and could only be conducted during the library's hours of operation. If the books did not have all the information you needed, you had to repeat this process. Even this was available only in the dozen or so countries that have good public libraries in the first place. But now, in the Internet age, the same research can be conducted in mere minutes, from any location. The precision of Google and other search engines continues to improve, and with deep learning, many improvements are self-propagating. There is a 10x to 30x increase in the productivity of searching for information.

If you feel that this example is imprecise, take the case of LinkedIn. It has enabled many aspects of career research and networking that were just not possible before. If a young person wishes to explore dozens of career paths and estimate common patterns, the utility of a certain degree, or the probability of reaching a certain title, LinkedIn has an endless supply of information and people you can identify and communicate with.

Yet despite all of this, job searches are just as lengthy as in the days before the Internet, LinkedIn, and other resources. If a candidate can match with three potential jobs in their search region at any given time, then the connection between employer and candidate should take mere weeks, not close to a year. There is no other widespread transaction within society that takes anywhere near as long. Despite new apps to organize the job search and new social media outlets that announce endless meetups and networking events, technology has clearly failed to generate any productivity gains in this process.



For one thing, the Internet has reduced the marginal cost of an application to so little that each position receives hundreds of candidates, unlike three or four back when paper resumes had to be sent via the US Postal Service. To cope with this, employers use software that searches resumes for keywords. This method selects for certain types of resumes, **with keyword optimization superceding more descriptive elements of the resume**, and filtering out many suitable candidates in favor of those who know how to game the keyword algorithm.

From this point, a desire to mitigate hiring risk combined with the lack of imagination inherent to most corporations defaults into a practice of increasing the number of interviewers that the candidate faces. Three rounds and a dozen interviews is not uncommon, but by most accounts, **job interviews are nearly useless** as predictors of performance. In reality, a candidate only needs to be interviewed by three people : the hiring manager, the manager above that, and one lateral peer. If these three people cannot make an accurate assessment, adding several other interviewers is not going to add additional value. Indeed, if the boss's boss cannot make accurate assessment of candidates, then they are failing at the primary skill that an executive is supposed to have. Reference checks are also a peculiar ritual, as a candidate will only submit favorably disposed references who have been contacted beforehand.

Modernizing Hiring For the Information Age : Matching openings with candidates should not be so tedious in this age of search engines, emailed resumes, and LinkedIn. Resistance to change and a miscalculation of risk and opportunity cost are the human obstacles standing athwart favorable evolution.

To correct this obsolete situation, consider the mismanagement that occurs at the source. Only after a hiring manager sees a persistent and pronounced need for additional personnel does the process of getting a requisition approved and advertised commence. Hence, the job begins to receive resumes only several months after the need for a new hire arose. After that point, the lengthy selection and interviewing process takes months more.

Instead, what if the Data Analytics of a corporate setting could be gathered, mined, and processed, so that the AI identifies a cluster of gaps within the existing team, and identifies suitable candidates from LinkedIn? Candidates with the correct skillset could be identified with a compatibility score such as '86% fit', '92% fit', and so on. The entire process from the starting point of where a team begins to find itself understaffed to when a candidate deemed to be an acceptable fit is hired, can compress from over a year to mere weeks. The hefty fees charged by recruiters vanish, and the shorter duration of unemployment reduces all the indirect costs of extended unemployment.

For this level of dynamic assessment of gaps and subsequent candidate mapping, the capability of search and data analytics within a corporation has to evolve to a far more advanced state than presently exists. Emails, performance

reviews, and project schedules, etc. all have to be searchable across the same search and patterning capabilities.

Then, this has to interface with LinkedIn, which itself has to become far more advanced with the capability for a candidate to continuously re-verify skills and prove certain competencies (through tests, certified courses, etc.).

The platform has had no real improvement in capabilities in the last few years, and the obvious next step - generating a complex set of skill parameters for LinkedIn members, and matching that pattern to employers with similar needs, is quite overdue. If this seems like added work for candidates, remember that this effort is far less than the amount of time and hassle it will save in the job search process.

Of course, such a capability across LinkedIn and some pattern matching machine learning engine will not be adopted overnight. After all, **corporations still think university degrees and school rank are good indicators of candidate job performance, despite both evidence and common sense**. After that, the interface between some internal corporate software and LinkedIn will take a lot of work to become robust. Finally, the belief that a greater number of interviews somehow reduces the risk of hiring a candidate is a belief that will be difficult to purge.

But eventually, with technology companies leading the way, the massive hidden cost of current hiring practices may come to light, and give way to a system that uses AI to find more precise matches with much greater speed.

Conclusion : We now possess the machine learning capabilities to dynamically detect gaps within corporate teams and organizational structures that may be large enough to warrant an increase in headcount. These gaps can be matched with parameters that can be mined from LinkedIn profiles, and provide candidates with an assessment of their approximate fit. A percentage score calculated for each candidate is not only a more accurate indicator than the very imprecise interview process, but is far quicker as well. It is high time that these tools were created by LinkedIn and others, and that corporate culture shifted towards their adoption.

This application of AI is the **second** most necessary technological disruption that AI can deliver to our civilization at present. For the first, check back for the next article.

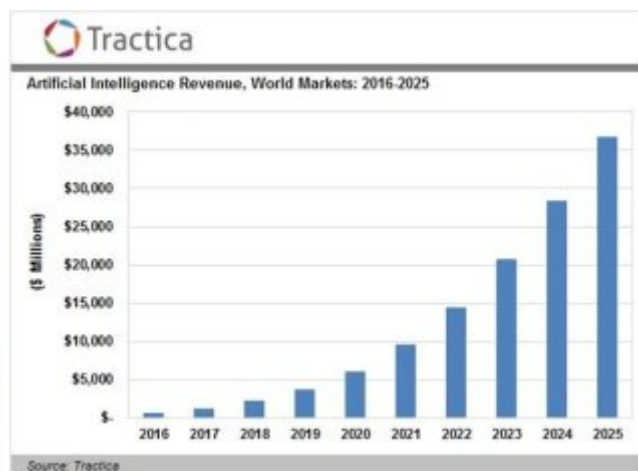
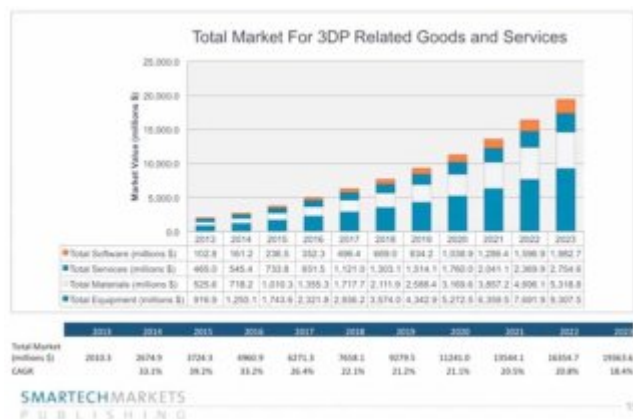
I do not have the time to pursue a company built around this type of machine learning product, but if someone else is inspired to take up this challenge, I would certainly like to be on your board of directors.

Related ATOM Chapters :

11. Implementation of the ATOM age for Individuals

Artificial Intelligence and 3D Printing Market Growth

The Futurist · 21 November 2016 · Archived copy · Original



I came across some recent charts about the growth of these two unrelated sectors, one disrupting manufacturing, the other disrupting software of all types (click to enlarge). On one hand, each chart commits the common error of portraying smooth parabola growth, with no range of outcomes in the event of a recession (which will surely happen well within the 8-year timelines portrayed, **most likely as soon as 2017**). On the other hand, these charts provide reason to be excited about the speed of progress seen in these two highly disruptive technologies, which are **core pillars of the ATOM**.

This sort of growth rate across two quite unrelated sectors, while present in many prior disruptions, is often not noticed by most people, including those working in these particular fields. **Remember, until recently, it took decades or even centuries to have disruptions of this scale**, but now we see the same magnitude of transformation happen in mere years, and in many pockets of the economy. This supports the case that all technological disruptions are interconnected and the aggregate size of all disruptions can be calculated, which is a core tenet of the ATOM.

Related :

3. Technological Disruption is Pervasive and Deepening

Google Talk on the ATOM

The Futurist · 26 December 2016 · Archived copy · Original

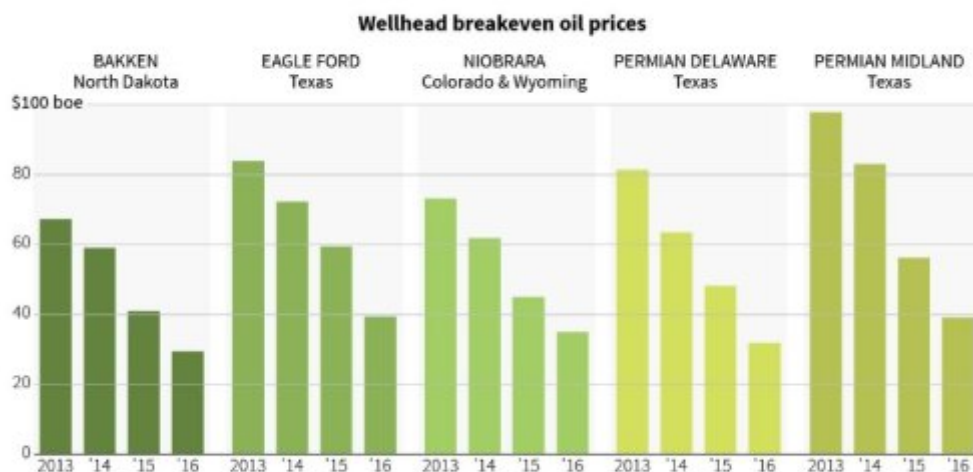
Kartik Gada had a Google Talk about the ATOM :

ATOM Award of the Month, January 2017

The Futurist · 31 January 2017 · Archived copy · Original

With the new year, we are starting a new article series here at The Futurist. The theme will be a recognition of exceptional innovation. Candidates can be any industry, corporation, or individual that has created an innovation exemplifying the very best of technological disruption. The more **ATOM** principles exhibited in an innovation (rising living standards, deflation acting in proportion to prior inflation in the incumbent industry, rapid continuous technological improvement, etc.), the greater the chance of qualification.

The falling cost of U.S. shale production



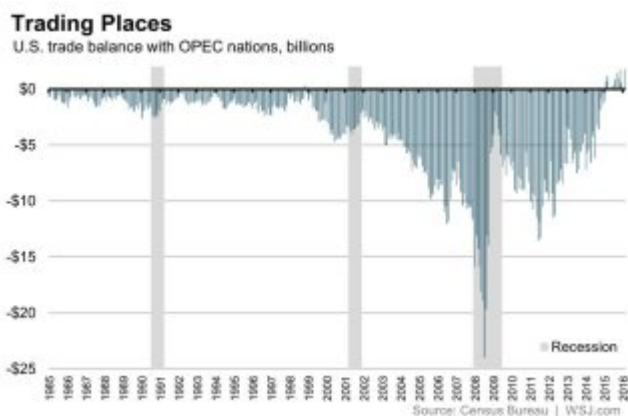
Source: NASWellCube

S. Culp, 29/11/2016

REUTERS

The inaugural winner of the ATOM Award of the Month is the US hydraulic fracturing industry. While 'fracking' garnered the most news in 2011-13, the rapid technological improvements continued. Natural gas continues to hover around just \$3, making the US one of the most competitive countries in industries where natural gas is a large input. Oil prices continue to fall due to ever-improving efficiencies, and from the chart, we can see how many of the largest fields have seen breakevens fall from \$80 to under \$40 in just the brief 2013-16 period. This is of profound importance, because *now even \$50 is a profitable price for US shale oil*. There is no indication that this trend of lower breakeven prices has stopped. Keep in mind that the massive shale formations in California are not even being accessed yet due to radical obstruction, but a breakeven of \$30 or lower ensure the pressure to extract this profit from the Monterey shale continues to rise. Beyond that, Canada has not yet begun fracking of its own, and when it does, it will certainly have at least as much additional oil as the US found.

This increase, which is just an extra 3M barrels/day to US supply, was nonetheless enough to capsize this highly elastic market and crash world oil prices from \$100+ to about \$50. Given the improving breakevens, and possibility of new production, this will continue to pressure oil prices for the foreseeable future. This has led to the US turning the tables on OPEC and reversing a large trade deficit into what is now a *surplus*.



If you told any of those 'peak oil' Malthusians that the US would soon have a trade surplus with OPEC, they would have branded you as a lunatic. Note how that ill-informed Maoist-Malthusian cult utterly vanished. Furthermore, this plunge in oil prices has strengthened the economies of other countries that import most of their oil, from Japan to India.

Under **ATOM principles**, technology always finds a way to lower the cost of something that has become artificially expensive and is hence obstructing the advancement of other technologies. Oil was a premier example of this, as almost all technological innovation is done in countries that have to import large portions of their oil, while almost none is done by oil exporters. Excess wealth accumulation by oil exporters was an anti-technology impediment, and demanded the attention of a good portion of the **ATOM**. Remember that the worldwide ATOM is of an ever rising size, and comprises of the sum total of all technological products in production at a given time (currently, about 2% of world GDP). Hence, all technological disruptions are interconnected, and when the ATOM is freed up from the completion of a certain disruption, that amount of disruptive capacity becomes available to tackle something new. Given the size of this disruption to oil prices and production geography, this occupied a large portion of the ATOM for a few years, which means a lot of ATOM capacity is now free to act elsewhere.

This disruption was also **one of the most famous predictions of mine here at The Futurist**. In 2011, I predicted that high oil prices was effectively a form of burning a candle at both ends and such prices were jolting at least six compensating technologies into overdrive. I provided an equation predicting when oil would topple, and it toppled well in accordance with that prediction (**even sooner than the equation estimated**).

This concludes our very first ATOM AotM to kick off the new year. I need candidate submissions from readers in order to get a good pool to select from. Criteria include the size and scope of the disruption, how anti-technology the disrupted incumbent was, and an obvious improvement in the quality of a large number of lives through this disruption.

ATOM Award of the Month, February 2017

The Futurist · 26 February 2017 · Archived copy · Original

After the **inaugural award in January**, a new month brings a new ATOM AotM. This time, we go to an entirely different sector than we examined last time. The award for this month goes to the collaboration between the Georgia Institute of Technology, Udacity, and AT&T to provide a **fully accredited Masters of Science in Computer Science degree**, for the very low price of \$6700 on average.

The disruption in education is a topic **I have written about at length**. In essence, most education is just a transmission of commoditized information, that, like every other information technology, should be declining in cost. However, the corrupt education industry has managed to burrow deep into the emotions of its customers, to such an extent that a rising price for a product of stagnant (often declining) quality is not even questioned. For this reason, education is in a bubble that is already in the process of deflating.

What the MSCS at GATech accomplishes is four-fold :

- Lowering the cost of the degree by almost an order of magnitude compared to the same degree as similarly-ranked schools
- Making the degree available without relocation to where the institution is physically located
- Scaling the degree to an eventual intake of 10,000 students, vs. just 300 that can attend a traditional in-residence program at GATech
- Establishing best practices for other departments at GATech, and other institutions, to implement in order to create a broader array of MOOC degree programs

After a slow start, enrollment now is reported to be over 3300 students, representing a significant fraction of students presently studying MS-level computer science at equal or higher ranked schools. The only reason enrollment has not risen all the way up to the full 10,000 is due to **insufficient resourcefulness in shopping around and implementing ATOM principles to greatly increase one's living standards through ATOM means**. Aside from perhaps the top two schools like MIT and Stanford, there is perhaps no greater value for money than the GATech MSCS, which will become apparent as the slower adopters drift towards the program, particularly from overseas.

Eventually, the sheer size of enrollment will rapidly lead to GATech becoming a dominant alumni community within computer science, forcing other institutions to catch up. When this competition lowers costs even further, we will see one of the most highly paid and future-proof professions being accessible at little or no cost. When contrasted to the immense costs of attending medical or law school, many borderline students will pursue computer science ahead of professions with large student debt burdens, creating a self-reinforcing cycle of ever-more computer science and **ATOM** propagation. The fact that one can enroll in the program from overseas will attract many students from countries that do not even have schools of GATech's caliber (i.e. most countries), generating local talent despite remote education.

Crucially, this is strong evidence of how the ATOM always finds new ways to expand itself, since the field most essential to the feeding of the ATOM, computer science, is the one that found a way to greatly increase the number of people destined to work in it, by attacking both cost thresholds and enrollment volumes. This is not a coincidence, because the ATOM always finds a way around anything that is inhibiting the growth of the ATOM, in this case, access to computer science training. Subsequent to this, the ATOM can increase the productivity of education even in less ATOM-crucial fields medicine, law, business, and K-12, since the greatly expanded size of the computer science profession will provide entrepreneurs and expertise to make this happen. This is how the ATOM captures an ever-growing share of the economy into rapidly-deflating technological fundamentals.

As always, the ATOM AotM succeeds through reader suggestions, so feel free to suggest candidates. Criteria include the size and scope of the disruption, how anti-technology the disrupted incumbent was, and an obvious

improvement in the quality of a large number of lives through this disruption.

Related :

[The Education Disruption : 2015](#)

[11. Implementation of the ATOM Age for Individuals](#)

Mortgages : The Ultimate FinTech Disruption

The Futurist · 8 March 2017 · Archived copy · Original

When people think of FinTech, they think of a few things like peer-to-peer lending, payment companies, asset management firms, or maybe even cryptocurrencies. But one of the most outdated yet burdensome costs in all of finance, spread across the widest range of people, is still overlooked. The mortgage lending process is heavily padded with fees that are remnants of a bygone age.

Enter the **ATOM**.

First, we must begin with the effect of technology on short-term interest rates. The Fed Funds rate was close to zero for several years, and it is apparent that any brief increase in rates by the Federal Reserve will swiftly be reversed once markets punish the move in subsequent months. We are in an age of accelerating and exponential technological deflation, and not only will the Fed Funds rate have to be zero forever, but money-printing will be needed to offset deflation. This process has already been underway for years, and is not yet recognized as part of the long term trend of technological progress.

A 30-year mortgage was the standard format for decades, with a variable-rate mortgage seen as risky after a borrower locks in a low rate on their 30-year mortgage. But when the Fed Funds rate was at nearly zero, the LIBOR (London Interbank Offer Rate) hovered around 0.18% or so. If you get a variable-rate mortgage, then the rate is calculated off of the LIBOR, with an additional premium levied by the lending institution. This premium is about 1.5% or more. When the LIBOR rate was over 3% not too many years ago, the lender premium was only a third of the mortgage, but now, it is 85-90% of the mortgage. So instead of paying 0.18%, the lender pays 1.7%. This huge buffer represents one of the most attractive areas for FinTech to disrupt, as what was once a secondary cost is now the overwhelmingly dominant padding, itself a remnant of a bygone age.

When almost 90% of the interest charged in a mortgage merely represents the value that the lending institution provides, we can examine the components of this and see which of those could be replaced with a lower cost technological alternative. The lender, such as a major bank, provides a brand name, a mortgage officer to meet with face-to-face, and other such provisions. All of this is either unnecessary, or can be provided at much lower cost with the latest technologies. For example, blockchains can ensure the security aspects of the mortgage transaction are robust. Online consumer review services can provide an extra layer of reputational buttressing to any innovative new lending platform. The rationale for such a hefty mortgage markup over the underlying interest rate is just no longer there.

If the lender premium in a mortgage falls from 85-90% down to, say, 50%, then the rate on an adjustable rate mortgage will decline to just twice the LIBOR, or about 0.4%. Even though the Federal Reserve has recently increased the Fed Funds rate, this is very temporary, and 0% will be the Fed Funds rate for the majority of the foreseeable future, just as it has been for the last 9 years.

When this sort of ATOM-derived cost savings on interest payments percolates through the economy, it will cause a series of disruptions that will greatly reduce one of the last main consumer expenditures not yet being attacked by technology. Housing costs have risen above the inflation rate in many major cities, against the grain of technology. This is unnatural, since a home does not spontaneously renovate itself, get bigger, or otherwise increase in inherent value. On the contrary, the materials deteriorate over time, so the value should fall. Yet, home prices rise despite these structural forces, due to artificial decisions to restrict supply, lower bond yields through QE, etc. This artificial propping up of home prices masks the excessive costs in the industry, particularly in the mortgage-lending sector. As Fintech irons out the aforementioned outdated expenses in the mortgage-lending process, many fundamental assumptions about home ownership will change.

Home ownership is a very emotional concept for many buyers (which is why there is a widespread misconception that a person 'owns' their home even while they are making mortgage payments on it, when in reality, ownership is

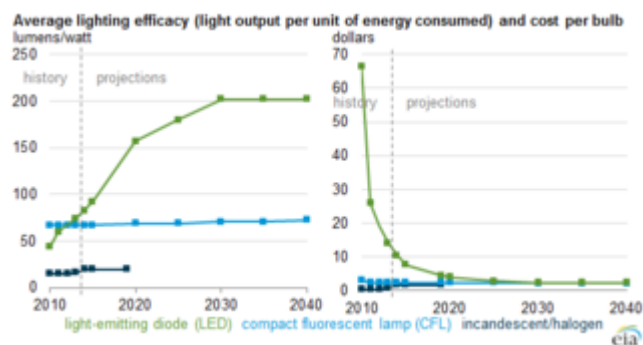
achieved only when the mortgage is fully paid off). This emotion obscures the high costs of obsolete products and procedures that continue to reside in the mortgage industry.

Amidst all the technological disruptions we have seen within the last generation, most people still don't understand that the central origin of most disruptions is an outdated, expensive incumbent system. But the FinTech wing of the **ATOM** has started the 'cracks in the dam' process against a very substantial and widely-levied cost, and this may be the disruption that brings FinTech's dividends to the masses.

ATOM Award of the Month, March 2017

The Futurist · 26 March 2017 · Archived copy · Original

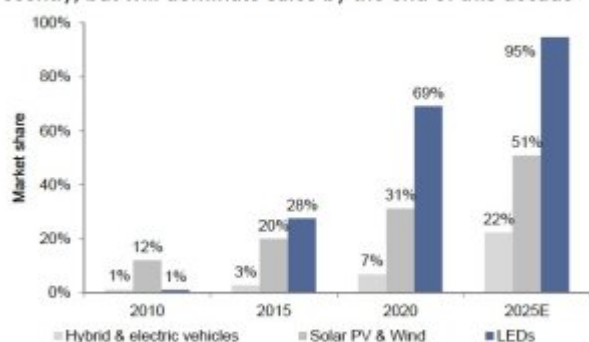
It is that time of the month again. For our third ever award of the ATOM AotM, we return to [an article I wrote over 10 years ago about the lighting revolution](#). At that time, when the disruption was still in the future, I highlighted how the humble status of the light fixture leads to an associated disruption going widely unnoticed. That continues to be true even today, despite the important product transition that most people have already undertaken.



So the ATOM AotM award for March 2017 goes to the LED lightbulb. Something that most people do not even notice is a major engine of the ATOM, as it has introduced rapid price/performance improvements into what used to be a stagnant product.

Charge of the Light Brigade : Remember that the average household has about 25 light bulbs on average. From the chart, we can see that light output per unit of energy and cost per watt of LED lighting are both improving rapidly, leading to a double-exponential effect. Lighting is hence now fully in the path of the **ATOM** and is seeing progress at a rate entirely beyond what the predecessor technology could have have experienced, and is indeed one of the fastest technology shifts ever (see the second chart). Bulbs are now purchased in packs of 4-12 units, rather than the single-unit purchases of the recent past. The expected electricity savings worldwide are estimated to be over \$100 Billion per year in the near future.

Exhibit 19: The rapid adoption of LEDs in lighting marks one of the fastest technology shifts in human history. LEDs for general lighting were commercialized only recently, but will dominate sales by the end of this decade



Source: IHS, Company data, IEA, IRENA, BP, Goldman Sachs Global Investment Research.

The domino effects of this are immense. Follow the sequence of steps below :

- LED bulbs are reducing the electricity consumed by lighting.
- This reduction in demand more than accommodates the proliferation of electric cars. The first 100 million electric cars worldwide (a level we are still extremely far from) will merely offset the loss of electricity demand for lighting.
- The spread of electric cars with no net rise in electricity consumption nonetheless reduces oil consumption and

hence oil imports. The US already has a trade surplus with OPEC, for the first time in half a century, and this force is strengthening further. **Even if the price per barrel of oil had not fallen through fracking**, the number of imported barrels still would have plunged.

- So even though most lighting is not fueled by oil, it created a puncture point through which a second-degree blow to oil demand arose.

That is truly amazing, making LED lighting not just a component of the ATOM but one of the largest disruptions currently underway.

That concludes this month's ATOM AotM. I need more reader submissions to ensure we have a good award each month.

Related :

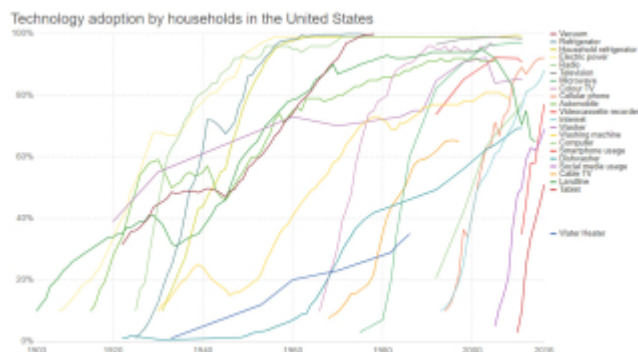
3. Technological Disruption is Pervasive and Deepening.

The Imminent Revolution in Lighting, and Why it is More Important Than You Think

The Upgrade Paradox

The Futurist · 16 April 2017 · Archived copy · Original

There is an emerging paradox within the flow of technological diffusion. The paradox is, ironically, that rapid progress of technology has constrained its own ability to progress further.



What exactly is the meaning of this? As we see from **Chapter 3 of the ATOM**, all technological products currently amount to about 2% of GDP. The speed of diffusion is ever faster (see chart), and the average household is taking on an ever-widening range of rapidly advancing products and services.

Refer to the section from that chapter, about the number of technologically deflating nodes in the average US household by decade (easily verified by viewing any TV program from that decade), and a poll for readers to declare their own quantity of nodes. To revisit the same thing here :

Include : Actively used PCs, LED TVs and monitors, smartphones, tablets, game consoles, VR headsets, digital picture frames, LED light bulbs, home networking devices, laser printers, webcams, DVRs, Kindles, robotic toys, and every external storage device. Count each car as 1 node, even though modern cars may have \$4000 of electronics in them.

Exclude : Old tube TVs, film cameras, individual software programs and video games, films on storage discs, any miscellaneous item valued at less than \$5, or your washer/dryer/oven/clock radio just for having a digital display, as the product is not improving dramatically each year.

Take our poll <https://polldaddy.com/poll/9329095/>

The estimation of results that this poll would have yielded by decade, for the US, is :

1970s and earlier : 0

1980s : 1-2

1990s : 2-4

2000s : 5-10

2010s : 12-30

2020s : 50-100

2030s : Hundreds?

Herein lies the problem for the average household. The cost to upgrade PCs, smartphones, networking equipment,

TVs, storage, and in some cases the entire car, has become expensive. This can often run over \$2000/year, and unsurprisingly, upgrades have been slowing.

The technology industry is hence a victim of its own success. By releasing products that cause so much deflation and hence low Nominal GDP growth and sluggish job growth, the technology industry has been constricting its own demand base. Amidst all the job-loss through technological automation, the hiring of the tech industry itself is constrained if fewer people can keep buying their products. If the bottom 70-80% of US household income brackets can no longer keep up with technological upgrades, their ability to keep up with new economic opportunities will suffer as well.

This is why monetization of technological progress into a dividend is crucial, which is where **the ATOM Direct Universal Exponential Stipend (DUES) fits in**. It is so much more than a mere 'basic income', since it is directly indexed to the exact speed to technological progress. As of April 2017, the estimated DUES amount in the US is \$500/month (up from \$400/month back in February 2016 when the ATOM was first published). A good portion of this cushion enables faster technology upgrades and more new adoption.

ATOM Award of the Month, April 2017

The Futurist · 30 April 2017 · Archived copy · Original

It is time for the ATOM AotM for April 2017, for which we return to [an article I wrote way back in 2009](#). That article is titled '[The Publishing Disruption](#)', and at the time of writing, we were on the brink of a transformation in content publication as seismic as the invention of the Gutenberg printing press. Since that time, the anticipated sequence of events unfolded as expected.

To excerpt from that article, consider how many centuries of background evolution occurred to get us to where we were in 2007 :

What a unique thing a book is. Made from a tree, it has a hundred or more flexible pages that contain written text, enabling the book to contain a large sum of information in a very small volume. Before paper, clay tablets, sheepskin parchment, and papyrus were all used to store information with far less efficiency. Paper itself was once so rare and valuable that the Emperor of China had guards stationed around his paper possessions.

Before the invention of the printing press, books were written by hand, and few outside of monasteries knew how to read. There were only a few thousand books in all of Europe in the 14th century. Charlemagne himself took great effort to learn how to read, but never managed to learn how to write, which still put him ahead of most kings of the time, who were generally illiterate.

But with the invention of the printing press by Johannes Gutenberg in the mid-15th century, it became possible to make multiple copies of the same book, and before long, the number of books in Europe increased from thousands to millions.

But then, note how incredibly low-tech and low-productivity the traditional publishing industry still was well into the 21st century :

Fast forward to the early 21st century, and books are still printed by the millions. Longtime readers of The Futurist know that I initially had written a book (2001-02), and sought to have it published the old-fashioned way. However, the publishing industry, and literary agents, were astonishingly low-tech. They did not use email, and required queries to be submitted via regular mail, with a self-addressed, stamped envelope included. So I had to pay postage in both directions, and wait several days for a round trip to hear their response. And this was just the literary agents. The actual publishing house, if they decide to accept your book, would still take 12 months to produce and distribute the book even after the manuscript was complete. Even then, royalties would be 10-15% of the retail price. This prospect did not seem compelling to me, and I chose to parse my book into this blog you see before you.

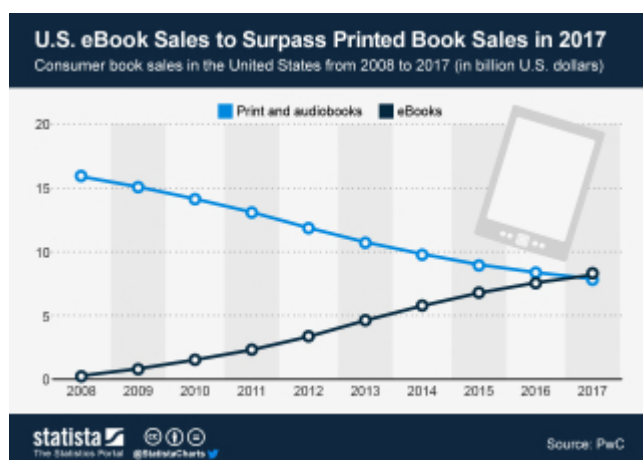
The refusal by the publishing industry to use email and other productivity-enhancing technologies as recently as 2003 kept their wages low. Editors always moaned that they worked 60 hours a week just to make \$50,000 a year, the same as they made in 1970. My answer to them is that they have no basis to expect wage increases without increasing their productivity through technology.

An industry this far behind was just begging to be disrupted. As we have seen from [the ATOM](#), the more overdue a particular disruption is, the more dramatic and swift the disruption when it eventually occurs, as the distance to travel just to revert to the trendline of that particular innovation, is great. Proceeding further in the original article :

The Amazon Kindle launched in late 2007 at the high price of \$400. Many people feel that the appeal of holding a physical book in our hands cannot be replaced by a display screen, and take a cavalier attitude towards dismissing e-readers. The tune changes upon learning that the price of a book on an e-reader is just a

third of what the paper form at a brick-and-mortar bookstore, with sales tax, would cost.

As of 2017, an entry-level Kindle 8 costs just \$80 (with 3 GB of storage), yet is far more advanced than the \$400 Kindle of 2007 (with just 250 MB of storage). Cumulative Kindle sales are estimated to be over 100 million units now.



But the Kindle hardware is not the real disruption, as it is a new purchase imposed on people who needed no such device to read paper books. The real ATOM disruption is in books themselves. Now, an author can publish directly on Kindle, and at a \$10 sales price, immediately begins to receive a 70% royalty. Contrast that with the 10-15% royalty on a \$20 sales price in traditional book publishing, that too after a 12-month waiting period even after the manuscript is complete. While bound books may still make sense for famous authors, the new market created by the Kindle has enabled the publication of many books that only expect to sell 10,000 copies. There is no material involved, so the production and distribution cost of any such publication has literally fallen by a factor of millions. A hefty cost is now no cost, **precisely as the ATOM predicts.**

2017 is the year where e-book sales have surpassed print and audio book sales, as per the chart. Since the previous article, brick and mortar bookstores have seen a torrent of closures. Borders Bookstores has completely shut down all of its 511 bookstores in the US. Barnes & Noble still exists, partly due to capturing the residual Borders revenue, but a growing share of B&N's in-store revenue is now from the coffee shop, magazines, and certain specialty book sales.

The unshackling of the bottom 99% of authors and aspiring authors from the extreme inefficiency of the traditional publishing industry has unleashed more content than was ever possible before, and is a market upgrade just as significant as that of the Gutenberg press in the 15th century. It is also a perfect demonstration of the accelerating rate of change, for while it took centuries for the diffusion of printed books to manifest, the e-book transformation was in mere years. For this reason, the Amazon Kindle and e-book ecosystem are the winner of April 2017's ATOM Award of the Month. I need more candidate submissions for future ATOM AotM awards.

Related ATOM Chapters :

3 : **Technological Disruption is Pervasive and Deepening**

4 : **The Overlooked Economics of Technology**

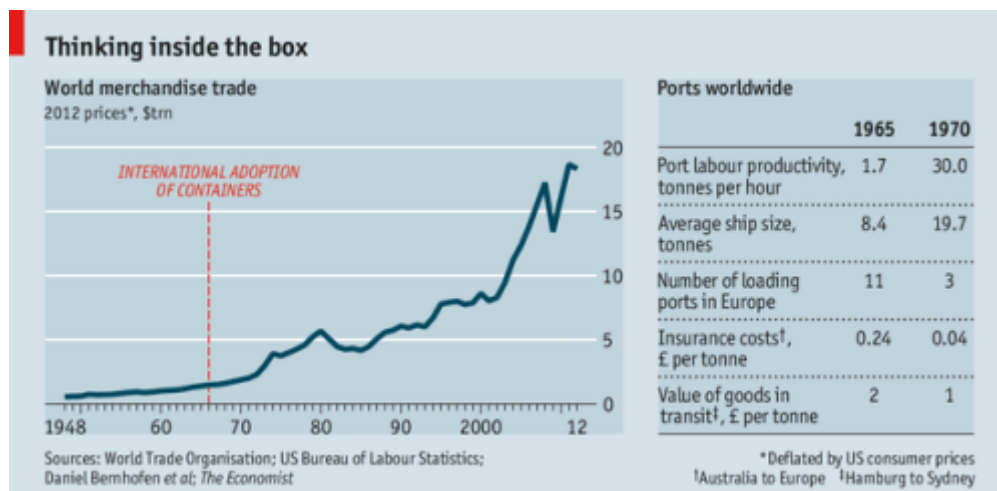
ATOM Award of the Month, May 2017

The Futurist · 24 May 2017 · Archived copy · Original

For May 2017, the award goes in a direction that not many associate with technological disruption. Remember that the **ATOM** relates to not merely products that themselves have a rapidly improving cost/benefit profile, but also towards technological improvements in products, processes, and services that themselves may not be high-tech.

The standard shipping container is just an inert box, and most people rarely ever see one. It is not improving from one year to the next in any meaningful sense. The real innovation was in the process technologies enabled through this standardization, and the immense deflation derived through these technologies.

Malcolm McLean, a trucking tycoon, envisioned the idea of standardized container sizes, and generously decided to give his idea away for free rather than patent it and seek profit. After the first experiment was a success, rapid adoption and port standardization followed.



As we can see from the table (click to enlarge), the introduction of the shipping container swiftly led to an almost 20-fold increase in unloading rates from 1965 to 1970, an unusually rapid improvement of any productivity metric for such an early era. This increased speed led to larger ships, and this in turn led to larger and fewer ports. From an **ATOM** perspective, these productivity gains introduced a great deal of deflation in the prices of the goods themselves. A broader range of goods could be traded internationally, leading to many more countries being able to compete for the same export demand. New countries could merely join existing supply chains, rather than build entire industries from scratch. China's entry into international trade could not have been as rapid as it was, without the shipping container, and the advantages it conferred onto large countries over smaller ones, and to low cost production countries over expensive ones. This advantage is ongoing, as countries poorer than China are still in the process of integrating the low-hanging fruits of benefit that the shipping container provides.

Despite this introduction having begun almost 50 years ago, the full **ATOM** effect continues to increase. The precise logistics of the entire container-shipping ecosystem demands more powerful computation, sensors, and other innovations like RFID tags and GPS tracking. Furthermore, supply chains transporting trillions of dollars of goods each year generate a huge amount of data, which for the longest time was not even being utilized. Any large and ever-growing collection of data will attract Artificial Intelligence onto it, and this AI will generate additional productivity gains for participants in the supply chain, and hence price reductions for end-users.

Since shipping containers are produced in such volume, there are ideas emerging to use them elsewhere, such as a building block for modular construction, or as simple pop-in swimming pool enclosures.

For this reason, the shipping container, an inert metal box that transformed the entire award, receives the May 2017 **ATOM AotM**.

H/T : Geoman

Recent TV Appearances for The ATOM

The Futurist · 5 June 2017 · Archived copy · Original

I have recently appeared on a couple of television programs. The first was Reference Point with Dave Kocharhook, as a two-part Q&A about The ATOM.

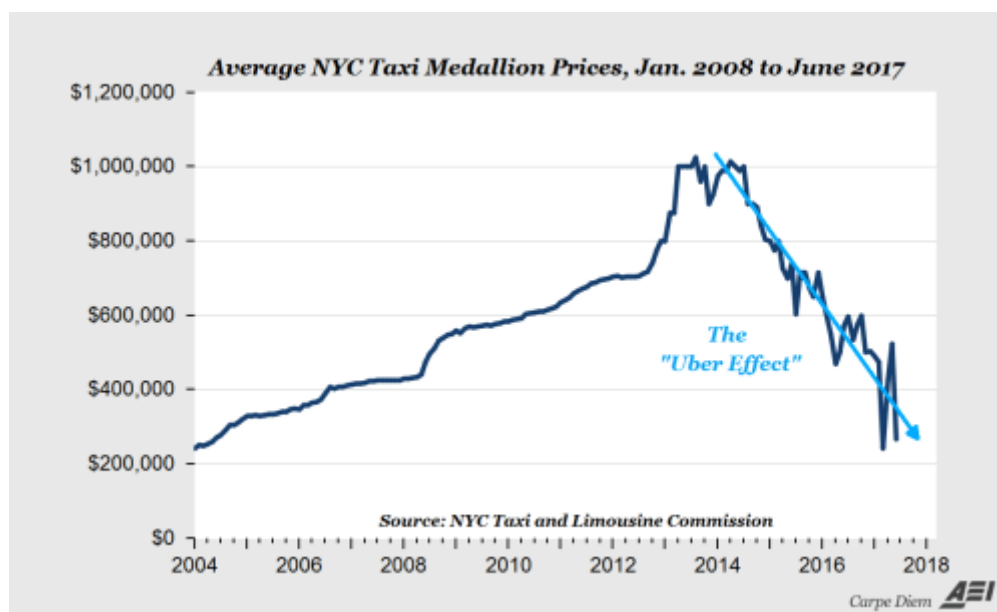
The next one was FutureTalk TV with Martin Wasserman, that included a 10-minute Q&A about The ATOM.

Inch-by-inch, we will get there. The world does not have to settle for our current substandard status quo.

As always, all media coverage is available [here](#).

ATOM Award of the Month, July 2017

The Futurist · 19 July 2017 · Archived copy · Original



The ATOM AotM for

July 2017 reminds us of the true core principles of **the ATOM**. Whenever anything becomes too expensive relative to value provided, particularly if done so through artificial government intervention in markets, a technological solution invariably replaces the expensive incumbent.

Taxi medallions, particularly in New York City, are just the crudest form of city government corruption. Drunk with its own greed, the city ratcheted up the price of taxi medallions from \$200,000 in 2003 to \$1M in 2013, which is far faster than even the S&P500, let alone inflation. Note how there was no decline at all during the 2008-09 recession. This predatory extraction from consumers, **much like high oil prices artificially engineered by OPEC**, created a market window that might otherwise have not existed until several years later. This induced the ATOM to address this imbalance sooner than it otherwise might have, and gritty entrepreneurs swiftly founded companies like Uber and Lyft, which provided a dramatically better value for money. As a result, the price of taxi medallions in NYC fell by 80% from the inflated peak. The ATOM was at a sufficiently advanced level for the technological response to be as rapid as it was (unlike with, say, expensive oil in the 1973-81 period, when there was almost no ATOM of macroeconomic significance).

Remember that the reduction in cost for a certain ride and demolition of a seemingly intractable government graft obstacle is just the first of several ATOM effects. The second is the security of each driver and passenger being identified before the ride. The third is the volume of data that these millions of rides generate (data being one of the two core fuels of Artificial Intelligence). The fourth is the ability to dynamically adjust to demand spikes (the surge pricing that the economically illiterate malign). The fifth is the possibility of new service capabilities altogether. Recall **this excerpt from Chapter 11 of the ATOM** :

Automobile commuters with good jobs but lengthy commutes have joined Uber-type platforms to take a rider along with them on the commute they have to undertake anyway. The driver earns an extra \$200-\$400/week (against which an appropriate portion of car and smartphone costs can be applied as deductions) with no incremental input time or cost. Meanwhile, other commuters enjoy having one less car on the road for each such dynamically generated carpooling pair. The key is that a dead commute is now monetized even by corporate-class people, increasing passengers per car and reducing traffic congestion, while replacing dedicated taxicabs. For the macroeconomy, it also creates new VM where none existed before.

The creation of an entirely new sub-economy, with entirely new velocity-of-money (VM), is where new real wealth

creation is the purest. This effect of these ride-sharing platforms is still in its infancy. When autonomous vehicles replace human drivers, the loss of driver income is matched (indeed exceeded in post-tax terms) by savings to passengers.

It does not matter which company ultimately wins (Uber is having some PR problems lately), but rather that the disruption is already irreversible and woven into the fabric of the ATOM and broader society. Maybe Uber and Lyft will just be to transportation services what Data General and Commodore were to computing. The point is, this is a superb example of how the ATOM works, and how the transformation is often multi-layered.

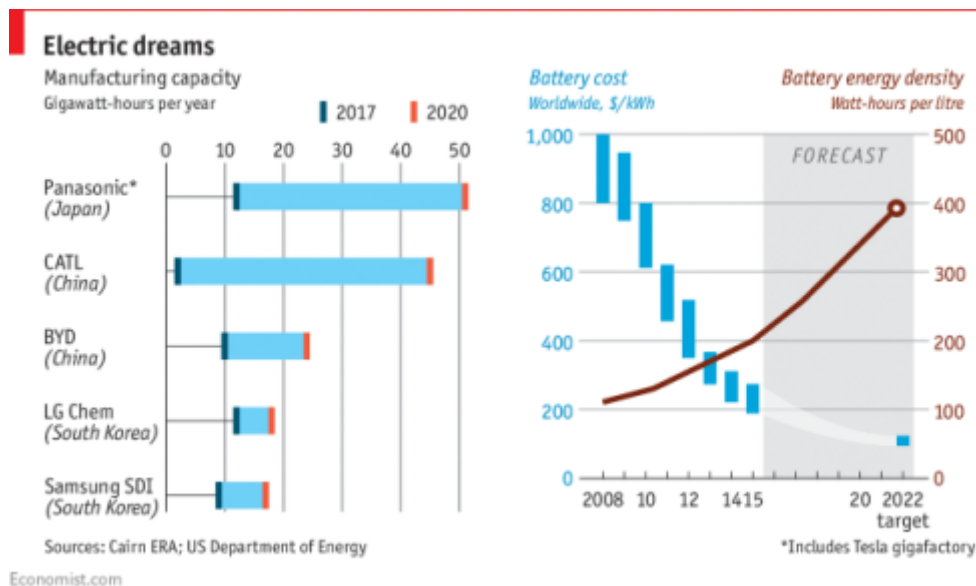
ATOM Award of the Month, August 2017

The Futurist · 27 August 2017 · Archived copy · Original

For the August 2017 ATOM AotM, we will bend one of the rules. The rule is that a disruption already has to have begun, and be presently underway.

But this time, a conversation in the last month's comments brought forth a vision of a quad-layer disruption that is already in the early stages and will manifest in no more than 15 years time. When fully underway, this disruption will further tighten the screws on government bodies that are far too sclerotic to adapt to the speed of the ATOM.

To start, we will list out the progression of each of the four disruptions separately.



1) Batteries are improving

quickly, and while electric vehicles are not yet competitive in terms of cost and charging speeds (partly due to the true cost of imported oil not being directly visible to consumers). At the same time, an electric car has far fewer moving parts, and fewer liquids to deal with. By many estimates, an electric car can last 300,000 before significant deterioration occurs, vs. 150,000 for an internal combustion engine car. Now, under the current ownership model, a car is driven only 12,000 miles/year and is parked 90% of the time or more. The second half of an electric vehicle's lifetime (150,001-300,000 miles) would only begin in year 13 and extend until year 25 of ownership, which is not practical. If only there were a way to avoid having the car remain idle 90% of the time, occupying parking spaces. It may take until 2032 for electric cars to compress the cost delta to the extent of being superior to ICE cars in total ownership costs for the early years, which then leads to the dividend available in the later years of the electric car's life.

2) Autonomous vehicles are a very overhyped technology. Stanford University demonstrated an early prototype in 2007. Yet even a decade later, a fully autonomous car that operates without any human involvement, let alone the benefit of having a network of such cars, seems scarcely any closer.

Eventually, by about 2032, cars will be fully autonomous, widely adopted, and communicate with each other, greatly increasing driving efficiency through high speeds and far less distance between cars than humans can manage. Uber-like services will cost 60-80% less than they do now, since the earnings of the human driver are no longer an element of cost, and Uber charges just 20-30% of the fare itself. It will be cheaper for almost everyone to take the on-demand service all the time, than to own a car outright or even take the bus. If such a car is driven 20 hours a day, it can in fact accrue 300,000 miles in just 5 years of use. This effectively is the only way that electric cars can be driven all the way up to the 300,000 limit.



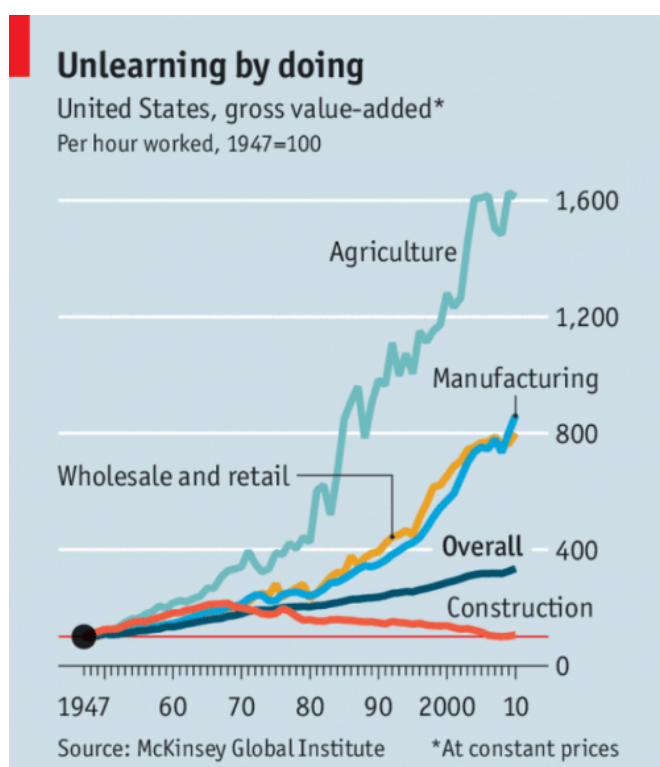
Economist.com

3) The displacement of brick and mortar retail by e-commerce has far greater implications for the US than for any other country, given the excessive level of land devoted to retail stores and their parking lots. The most grotesque example of this is in Silicon Valley itself (and to a lesser extent, Los Angeles), where vast retail strip mall parking lots are largely empty, yet are within walking distance of tall, narrow townhouses that cost \$1.5M despite taking up footprints of barely 600 sqft each.

As the closure of more retail stores progresses, and on-demand car usage reduces the need for so many parking spaces, these vast tracts of land can be diverted for another purpose. In major California metros, the economically and morally sound strategy would be to convert the land into multi-story buildings, preferentially residential. But extreme regulatory hurdles and resistance towards construction of any new housing supply will leave this land as dead capital for as long as the obstructionists can manage.

But in the vast open suburbs of the American interior, land is about to go from plentiful to extremely plentiful. If you think yards in the suburbs of interior cities are large, wait until most of their nearby strip malls are available for redevelopment, and the only two choices are either residential land or office buildings (there are more than enough parks and golf courses in those locations already). Areas where population is already flat or declining will have little choice but to build even more, and hope that ultra-low real estate costs can attract businesses (this will be no problem at all if the **ATOM-DUES program** is implemented by then).

This disruption is not nearly as much a factor in any country other than the US and, to a lesser extent, Australia, as other countries did not misallocate so much land to retail (and the associated parking lots) in the first place.



Economist.com

4) This fourth disruption is not as essential to this future as the first three, but is highly desirable, simply due to how overdue the disruption is. **It is quite shocking that the least productive industry in the private sector relative to 50 years ago is not education, not medicine, but construction.** US construction productivity has *fallen* over the last 50 years. Not merely failed to rise, mind you, but outright declined in absolute terms.

But remember, **under ATOM principles**, the more overdue a disruption is, and the more artificial the obstructions thwarting it, the more sudden it is when it eventually happens. China is not held back by the factors that have led to the abysmally low productivity in US construction, and when there is so much retail land to repurpose, pressure to revive that dead capital will just become too great, even if that means Chinese construction companies have to come in to provide what the US counterparts cannot. This pressure could be the catalyst of the long overdue construction productivity catchup. This topic warrants a lengthy article of its own, but that is for another day.

Hence, the first three factors, and possibly the fourth, combine by 2032 to generate a disruption that will be so comprehensive in the US that the inability of government to change zoning laws and permitting at anything close to the speed of market demand will be greatly exposed.

The first disruption, batteries, alone could be an **ATOM AotM**, but this time, the cumulative disruption from these multiple factors, even if it will take the next 15 years to accomplish, gets the award.

Related :

[The End of Petrotyranny \(and Victory\)](#)

[Why I Want\(ed\) Oil to Hit \\$120 per Barrel](#)

[A Future Timeline for Automobiles](#)

[A Future Timeline for Energy](#)

[Why \\$70/Barrel Oil is \(was\) Good for America](#)

Related ATOM Chapters :

3. Technological Disruption is Pervasive and Deepening

11. Implementation of the ATOM Age for Individuals

ATOM Award of the Month, September 2017

The Futurist · 30 September 2017 · Archived copy · Original

For September 2017, the ATOM AotM takes a very visual turn. With some aspects of the ATOM, seeing is believing.

Before photography, the only image capture was through sketches and paintings. This was time-consuming, and well under 1% were prosperous enough to have even a single hand-painted portrait of themselves. For most people, after they died, their families had only memories via which to imagine faces. If portraits were this scarce, other images were even scarcer. When image capture was this scarce, people certainly had no chance of seeing places, things, or creatures from far away. It was impossible to know much about the broader world.

The very first photograph was taken as far back as 1826, and black&white was the dominant form of the medium for over 135 years. That it took so long for b&w to transition to color may seem quite surprising, but the virtually non-existent ATOM during this period is consistent with this glacial rate of progress. The high cost of cameras meant that the number of photographs taken in the first 100 years of photography (1826-1926) was still an extremely small. Eventually, the progression to color film seemed to be a 'completion' of the technological progression in the minds of most people. What more could happen after that?

But the ATOM was just getting started, and it caught up with photography around the turn of the century with relatively little fanfare, even though it was notable that film-based photography and the hassles associated with it were removed from the consumer experience. The cost of film was suddenly zero, as was the transit time and cost from the development center. Now, everyone could have thousands of photos, and send those over email endlessly. Yet, standalone cameras still cost \$200 as of 2003, and were too large to be carried around everywhere at all times.



As the ATOM progressed, digital cameras got smaller and cheaper, even as resolution continued to rise. It was discovered that the human eye does in fact adapt to higher resolution, and finds previously acceptable lower resolution unacceptable after adapting to higher resolution. Technology hence forces higher visual acuity and the associated growth of the brain's visual cortex.

With the rise of the cellular phone, the ATOM enabled more and more formerly discrete devices to be assimilated into the phone, and the camera was one of the earliest and most obvious candidates. The diffusion of this was very rapid, as we can see from the image that contrasts the 2005 vs. 2013 Papal inaugurations in Vatican City. Before long, the cost of an integrated camera trended towards zero, to the extent that there is no mobile device that does not have one. As a result, 2 billion people have digital cameras with them at all times, and stand ready to photograph just about anything they think is important. Suddenly, there are countless cameras at every scene.

But lest you think the ubiquity of digital cameras is the end of the story, you are making the same mistake as those who thought color photography on film in 1968 was the end of the road. Remember that the **ATOM is never truly done**, even after the cost of a technology approaches zero. Digital imaging itself is just the preview, for now we have it generating an ever-expanding pile of an even more valuable raw material : data.

Images contain a large volume of data, particularly the data that associates things with each other (the eyes are to be above the nose, for example). Data is one of the two fuels of Artificial Intelligence (the other being inexpensive parallel processing). Despite over a decade of digital images being available on the Internet, only now are there enough of them for AI to draw extensive conclusions from them, and for Google's image search to be a major force in the refinement of Google's Search AI. Most people don't even remember when Google added image search to its capabilities, but now it is hard to imagine life without it.

Today, we have immediate access to image search that answers questions in the blink of an eye, and fosters even greater curiosity. In a matter of seconds, you can look up images for **mandrill teeth, the rings of Saturn, a transit of Venus over the Sun, the coast of Capri, or the jaws of Carcharocles Megalodon**. More searches lead to more precise recommendations, and more images continue to be added. In the past, the accessibility of this information was so limited that the invaluable tangents of curiosity just never formed. Hence, the creation of new knowledge speeds up. The curious can more easily pull ahead of the incurious.

Digital imaging is one of the primary transformations that built the Internet age, and is a core pillar of the impending ascent of AI. For this reason, it receives the September 2017 ATOM AotM.

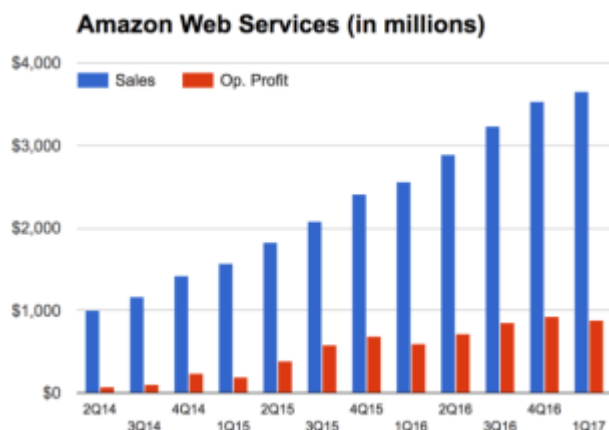
Related ATOM Chapters :

3. Technological Disruption is Pervasive and Deepening

ATOM Award of the Month, October 2017

The Futurist · 31 October 2017 · Archived copy · Original

For this month, the ATOM AotM goes to an area we have not visited yet. Enterprise software and associated hardware technologies may appear boring at first, but there is currently a disruption in this area that is generating huge productivity gains.



Amazon Web Services (AWS) is an ever growing list of services that replaces computing, storage, and networking expenditures at client companies. At present, over 90 different services are available. [Here is a slideshow of the various companies and sectors being disrupted by AWS.](#)

Cloud computing itself is relatively new, but this revolution by Amazon has taken direct slices out of the existing businesses of Microsoft, IBM, and Oracle, which were slow to deploy cloud-based solutions since they wanted to extend the lives of their existing product lines. Their anti-technology behavior deserves to be punished by the ATOM, and Amazon obliged. AWS is set to register \$14 Billion in revenue for 2017, most of which has replaced a greater sum of revenue at competing companies.

The biggest value is the lower cost of entry to smaller companies from the on-demand flexibility enabled by AWS. Now that IT Security and Compliance is far more cost-effective through AWS, the barrier to entry for smaller firms is lowered. This is particularly useful for clients in far-flung locations, enabling a decentralization that facilitates greater technological progress. Upgrades across computing, storage, software, networking, and security are disseminated seamlessly, and since far less hardware is used, the upgrade process is far more materially efficient. This removes a variety of smaller bottlenecks to technological progress, mitigating the corporate equivalent of the [Upgrade Paradox](#).

Another great benefit is elasticity, where a company does not have to worry about estimating hardware capacity needs in the future, which can often lead to overbuying of rapidly deflating technologies, or underbuying, which can cause customer dissatisfaction due to slow speeds. All of this can now be scaled dynamically through AWS.

For the productivity gains inherent to the scale and dynamism of AWS, it receives the October 2017 ATOM AotM.

Related ATOM Chapters :

[3. Technological Disruption is Pervasive and Deepening.](#)

ATOM Award of the Month, November 2017

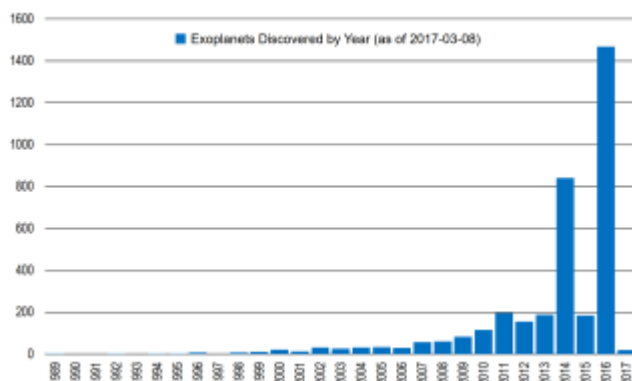
The Futurist · 20 November 2017 · Archived copy · Original



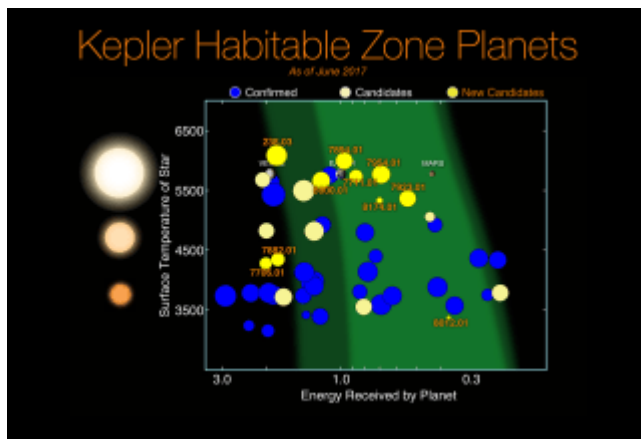
For this month, the ATOM AotM goes outward. Much like the [September ATOM AotM](#), this is another dimension of imaging. But this time, we focus on the final frontier. Few have noticed that the rate of improvement of astronomical discovery is now on an ATOM-worthy trajectory, such that this merited [an entire chapter in the ATOM publication](#).

Here at The Futurist, we have been examining telescopic progress for over a decade. In [September of 2006](#), I [estimated that telescope power was rising at a compounding rate of 26%/year](#), and that this trend has been ongoing for decades. 26%/year happens to be the square root of Moore's Law, which is precisely what is to be expected, since to double resolution by halving the size of a pixel, one pixel has to be divided into four. This is also why video game and CGI resolution rises at 26%/year.

Rising telescope resolution enabled the first exoplanet to be discovered in 1995, and then a steady stream after 2005. [This estimated rate led me to correctly predict that the first Earth-like planets would be discovered by 2010-11](#), and that happened right on schedule. But as with many such thresholds, after initial fanfare, the new status quo manifests and people forget what life was like before. This leads to a continuous underestimation of the rate of change by the average person.



Then, in May 2009, I published one of the most important articles ever written on The Futurist : [SETI and the Singularity](#). At that time, only 347 exoplanets were known, almost all of which were gas giants much larger than the Earth. That number has grown to 3693 today, or over ten times as many. Note how we see the familiar exponential curve inherent to every aspect of the ATOM. Now, even finding Earth-like planets in the 'life zone' is no longer remarkable, which is another aspect of human psychology towards the ATOM - that a highly anticipated and wondrous advance quickly becomes a normalized status quo and most people forget all the previous excitement.



The rate of discovery may soon accelerate further as key process components collapse in cost. Recent computer vision algorithms have proven themselves **to be millions of times faster than human examiners**. A large part of the cost of exoplanet discovery instruments like the **Kepler Space Observatory** is the 12-18 month manual analysis period. If computer vision can perform this task in seconds, the cost of comparable future projects plummets, and new exoplanets are confirmed almost immediately rather than every other year. This is another massive ATOM productivity jump that removes a major bottleneck in an existing process structure. A new mission like Kepler would cost dramatically less than the previous one, and will be able to publish results far more rapidly.

Given the 26%/year trendline, the future of telescopic discovery becomes easier to predict. In the same article, I made a dramatic prediction about SETI and the prospects of finding extraterrestrial intelligence. Many 'enlightened' people are certain that there are numerous extraterrestrial civilizations. While I too believed this for years (from age 6 to about 35), as I studied the accelerating rate of change, I began to notice that within the context of the Drake equation, any civilization even slightly more advanced than us would be dramatically more advanced. In terms of such a civilization, while their current activities might very well be indistinguishable from nature to us, their past activities might still be visible as evidence of their existence at that time. This led me to realize that while there could very well be thousands of planets in our own galaxy that are slightly less advanced than us, it becomes increasingly difficult for there to be one more advanced than us that still manages to avoid detection. Other galaxies are a different story, simply because the distance between galaxies is itself 10-20 times more than the diameter of the typical galaxy. Our telescopic capacity is rising 26%/year after all, and the final variable of the Drake equation, f_L , has risen from just 42 years at the time of Carl Sagan's famous clip in 1980, to 79 years now, or almost twice as long.

Hence, the proclamation I had set in 2009 about the 2030 deadline (21 years away at the time) can be re-affirmed, as the 2030 deadline is now only 13 years away.

If we do not find any evidence of extra-terrestrial intelligence by 2030, then we can confirm with some certainty that such civilizations are not as common as the proponents had hoped. Additionally, each subsequent year without a discovery makes the probability exponentially less likely.

Despite the enormity of our galaxy and the wide range of signals that may exist, even this is eventually superseded by exponential detection capabilities. At least our half of the galaxy will have received a substantial examination of signal traces by 2030. While a deadline 13 years away seems near, remember that the extent of examination that happens 2017-30 will be more than in all the 400+ years since Galileo, for Moore's Law reasons alone. The jury is out until then.

(all images from Wikipedia or Wikimedia).

Related Articles :

[New Telescopes to Reveal Untold Wonders](#)

[SETI and the Singularity](#)

[Telescope Power - Yet Another Accelerating Technology](#)

Related ATOM Chapters :

[12. The ATOM's Effect on the Final Frontier](#)

Recent TV Appearances

The Futurist · 24 December 2017 · Archived copy · Original

Inch by inch, the ATOM is reaching more people.

I was invited back to Reference Point a second time to discuss the ATOM :

I was also back on FutureTalk a second time to discuss blockchain and cryptocurrencies :

Remember that older media content for the ATOM is [here](#).

ATOM-Oriented Class at Stanford

The Futurist · 7 January 2018 · Archived copy · Original

I have been selected to teach a class at Stanford Continuing Studies, titled '[The New Economics of Technological Disruption](#)'. For Bay Area residents, it would be great to see you there. There are no assignments or exams for those who are not seeking a letter grade, and by Stanford standards, the price (\$525 for an 8-week class) is quite a bargain.

35 44 students have already signed up. [See the course description, dates, and more.](#)

ATOM Award of the Month, January 2018

The Futurist · 21 January 2018 · Archived copy · Original

With the new year, we have a new ATOM AotM. This is an award for a trend that ought to be easy for anyone to recognize who is at all familiar with Moore's Law-type concepts, yet is greatly overlooked despite quite literally being in front of people's faces for hours a day.

The most crude and uninformed arguments against accelerating technological progress are either of a "Word processing is no better than in 1993, so Moore's Law no longer matters" or "People can't eat computers, so the progress in their efficiency is useless" nature. However, the improvements in semiconductor and similar technologies endlessly finds ways into previously low-tech products, which is the most inherent ATOM principle.



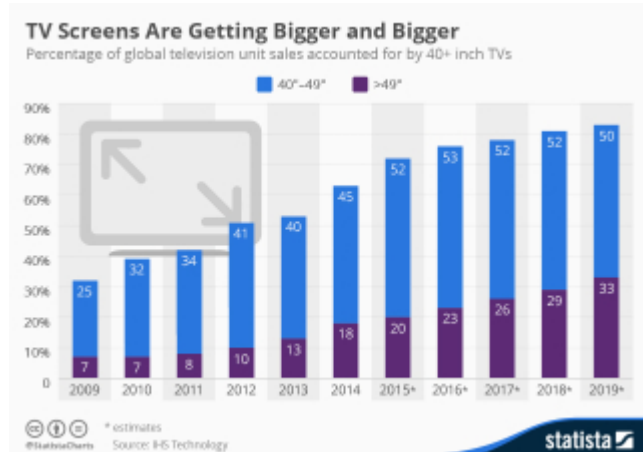
The concept of television has altered cultures across the world more than almost any other technology. The range of secondary and tertiary economies created around it are vast. The 1960 set pictured here, for \$795, cost 26% of US annual per capita GDP at the time. The equivalent price today would be \$15,000. Content was received over the air and this was often subject to poor reception. The weight and volume of the device relative to the area of the screen was high, and the floorspace consumed was substantial. There were three network channels in the US (while most other countries had no broadcasts at all). There was no remote control.

There were slow, incremental improvements in resolution and screen-size-to-unit-weight ratios from the 1960s until around 2003, when one of the first thin television sets was available at the retail level. It featured a 42" screen, was only 4 inches thick, and cost \$8000. Such a wall-mountable display, despite the high price, was a substantial improvement above the cathode ray tube sets of the time, most of which were too large and heavy to be moved by one person, and consumed a substantial amount of floor space.



But in true **ATOM** exemplification, this minimally-improving technology suddenly got pulled into rapid, exponential improvement (part of how deflationary technology increased from 0.5% of World GDP in 1999 to 1% in 2008 to 2% in 2017). Once the flat screen TV was on the market, plasma and LCD displays eventually gave way to LED displays, which are a form of semiconductor and improve at Moore's Law rates.

Today, even 60-inch sets, a size considered to be extravagant in 2005, are very inexpensive.



Like any other old electronic device, slightly out of date sets are available on Craigslist in abundance (contributing to the Upgrade Paradox). A functional used set that cost \$8000 in 2003 can hardly be sold at all in 2018; the owner is lucky if someone is willing to come and take it for free.

Since once ATOM-speed improvements assimilate a technology, the improvements never stop, and sets of the near future may be thin enough to be flexible, along with resolutions of 4K, 8K, and beyond. Sets larger than 240" (20 feet) are similarly declining in price and visible in increasing numbers in commercial use (i.e. Times Square everywhere). This is hence one of the most visible examples of ATOM disruption, and how cities of today have altered their appearance relative to the recent past.

This is a large ATOM disruption, as there are still 225 Million new sets sold each year, amounting to \$105 Billion/year in sales.

Related :

[The Impact of Computing](#)

Related ATOM Chapters :

[3. Technological Disruption is Pervasive and Deepening.](#)

ATOM Award of the Month, February 2018

The Futurist · 28 February 2018 · Archived copy · Original



For this month's ATOM AotM, we will address the sector that any thought leader in technological disruption recognizes as the primary obstruction to real progress. When we see that sectors that are overdue for disruption, such as medicine, education, and construction all happen to be sectors with high government involvement, the logical progression leads us to question why government itself cannot deliver basic services at comparable costs to private sector equivalents.

As just one example out of hundreds, in California and other high-tax states, the annual license plate registration can cost \$400/year. What does the taxpayer truly receive? The ability to trace license plates to driver's licenses and insurance. Why should such a simple system cost so much? It seems that it should only cost \$2/year under 2018 technological levels. By contrast, note how much value you receive from a \$96/year Netflix subscription. By all accounts, many basic government services could easily implement cost reductions of 98-99%.

While the subject of government inefficiency vs. the ATOM is perhaps the primary topic of this website and the [ATOM publication](#), just one small example across the world demonstrates what a modernized government looks like. The tiny country of Estonia contains just 1.3 million people. A desire to catch up from decades of being part of the Soviet Union perhaps spurred them into a unique desire to modernize and digitize government services into a state that Americans would scarcely believe could exist. Here are some articles by publication about Estonia's successful digitization, where you can read about specific details :

[The New Yorker](#)

[The Atlantic](#)

[Fortune](#)

Estonia has also taken early steps towards certain ATOM realities. While it does have high consumption taxes, income tax is a flat 21%, thereby saving immense costs in complexity and processing (which cost the US over \$700 Billion/yr). If only it figures out the ATOM principles around monetization of technological deflation, it could reduce income taxes to zero.

Now, for the unfortunate part. When a country manages to produce a product or service that the rest of the world wants and cannot produce at the same quality and price themselves, the first country can export the product to the outside world. From Taiwanese chipsets to South Korean smartphones and television sets to Italian cheeses, the extension of sales to exports is straightforward. Yet in the governance sector, despite being a third of the world economy, Estonia has no market where it can sell its services to hasten the digitization of other governments. Whether at the Federal, State, City, or County level, the United States has hundreds of governments that could simply hire Estonian consultants and implementation staff to rapidly install new services. This could be lucrative

enough to make Estonia a very wealthy country, and then attract competition from other countries (such as nearby Finland, which is attempting to follow Estonia's path). Yet, unlike a private sector product or service, governance just does not value efficiency or productivity to this extent. The State of California alone could save billions of dollars per year, and either spend the taxes on other things, or (preferably) pass the savings on to the taxpayers.

Before long, the ATOM will force even the largest nation states to improve their productivity of government services. But that process will be messy, and government officials may take a scorched-earth approach to defending their own rice bowls. Let us hope that Estonia inspires at least a few other countries into voluntary modernization.

Related ATOM Chapters :

10. Implementation of the ATOM Age for Nations.

How a Small Country Can Quickly Capture Gains from the Technological Economy

The Futurist · 3 April 2018 · Archived copy · Original

In the **ATOM publication**, we examine how the only way to address the range of seemingly unrelated economic challenges in a holistic manner is to monetize technological deflation. For reasons described therein, the countries best suited to do this are small countries with high technological density. Furthermore, we examine the importance of the first-mover advantage, where when a country can monetize the technological deflation in the rest of the world for the benefit of their domestic economy, the first \$1 Trillion is practically free money.

In **Chapter 10**, I outline a systematic program for how the US could theoretically transition to this modernization of the economy. But I then identify the four countries that are much more suitable than the US. These are two Western democracies (Canada and Switzerland) and two Pacific-Rim city states (Singapore and Hong Kong). But it is possible to create custom solutions for more countries as well. To determine how to do that, let us go back to a seminal event in the emergence of these ideas.

What Japan Discovered for the Benefit of Humanity : Few people have any awareness of what an important event happened in April of 2013. Up to that time, the US was the only country that had embarked on a program to engineer negative interest rates through monetary creation (rather than the punitive and reductive practice of deducting from bank accounts). Japan decided that after two decades of stagnation and extremely low interest rates, something more drastic and decisive had to be done. The early success of the US Quantitative Easing (QE) program indicated that a more powerful version of this could be effective against the even worse stagnation that Japan's economy was mired in.

In April of 2013, the Bank of Japan (BoJ) decided to go big. They embarked on a program of monetary easing in the amount of 30% of their annual GDP. This was a huge upgrade over the US QE programs for two reasons. Firstly, it was much larger as a proportion to the host nation's GDP, and secondly, it had no end date, enabling long-term decisions. Since the formal economics profession in the West is burdened by a wide range of outdated assumptions about money printing, inflation, and technology, the Western Economists yet again predicted high inflation. And yet again, they were wrong. There was no inflation then at the start of the program. Japan had correctly called the bluff of the inflation specter. The third-largest economy in the world could print 30% of its GDP per year for five years, and *still* experience no inflation. When I observed this, I drew the connection between technological deflation (worldwide) and the vanishing QE (also worldwide). Most of Japan's QE was flowing outside of Japan (and indeed into the US, which had long since stopped QE, and has forestalled a major market correction only by drawing from overseas QE, mainly from Japan). Hence, the combined QE of the world was merely offsetting the technological deflation worldwide. Japan's big gambit proved this, and in doing so, they showed us how much QE can be done before world inflation even hits 3% (i.e. much more than formal economists thought).

What is a Small, Prosperous Country to do? While it is always better to be a prosperous country than an impoverished one, almost every small country (the size of Canada or smaller) is faced with a major vulnerability in the modern economy. Their economy invariably depends on one or two major industries, and is hence vulnerable to a technological disruption that arises from somewhere else in the world. The need to diversify against such external risks is obvious, but most countries are not on the best path to achieve this goal.

These days, everyone I meet from the government of some foreign country seems to have the same goal for their country - to create an ecosystem of local technology startups. This goal is not just extremely difficult to attain, but it is very misguided. Technology is becoming increasingly governed by winner-take-all dynamics and capital concentration, which means even in the US, rival cities are unable to compete with Silicon Valley (which itself has concentrated into a smaller portion of the San Francisco Bay Area than was the case in the late 1990s). Small countries with technology sectors, such as Israel and Singapore, started decades ago and have a number of unique

factors in their favor, including a major Silicon Valley diaspora. Hence, a country that thinks it is productive to create a tech startup cluster in their countries will almost certainly create a situation where young people receive training at local expense, only to leave for Silicon Valley. So these initiatives only end up feeding Silicon Valley at the expense of the original country. Even if a few tech startups can be forcibly created in the country, it is extremely unlikely that they will achieve any great size within even 15 years.



Take, for example, a country like New Zealand. It has many favorable characteristics, but certain disadvantages as well in an increasingly globalized economy. It relies on agricultural and dairy exports, as well as the film industry and tourism. It is too remote to easily plug into the well-traveled routes of tech executives (less than 30M people live within 3000 miles of New Zealand) or major supply chains. It is too small to be a significant domestic market for tech (particularly when a functional tech ecosystem has to comprise of startups in multiple areas of tech in order to achieve rudimentary diversification). New Zealand's success in getting Hollywood films shot in New Zealand cannot similarly translate into getting some Silicon Valley business, as an individual film project has a short duration and distinct ending, with key personnel on site for just a brief period. Technology, by contrast, is inherently endless, and requires interdependency between many firms that have to have co-location. Furthermore, no society is capable of placing more than 1-2% of its population into high-tech professions and still have them be competitive at the international level (most tech innovation is done by people in the top 1% of cognitive ability). For this reason, a tech startup ecosystem does not create broad prosperity (it is no secret that even within Silicon Valley, only a fraction of people are earning almost all the new wealth. Silicon Valley has among the most extreme inequality found anywhere).

Now, from the research contained in the **ATOM publication**, we know that there is a far easier solution that can deliver benefits in a much shorter time. New Zealand's fiscal budget reveals that as of 2018, it collects about \$80 Billion in taxes and spends the same \$80B per year. The world was recently generating \$200B/month in QE and is still doing an insufficient \$120B/month. The entire annual budget of New Zealand is well below one month of the world's QE - the QE that is needed just to halt technological deflation. It would be very easy for New Zealand to waive all income taxes, and merely print the same \$80B/year from their central bank. A brief transition period can be inserted just to soften the temporary downgrades that international rating agencies deliver. But the waiver of income tax will boost New Zealand's economy with immediate effect. It can even enter and dominate the lucrative tax-haven industry until other countries adopt the same strategy.

As we know, it is difficult for government officials, legislators, and statesmen to take such a drastic step, particularly when the entire Economics profession is still mired in outdated thinking about how QE will someday, somehow cause inflation (despite being wrong about this for 9 years and over the course of \$20 Trillion in cumulative world QE). For this reason, a second, less drastic option is also available for New Zealand. That involves create what I describe as a **Sovereign Venture Fund**, where the **New Zealand Central Bank** creates a segregated account that is completely partitioned off from the domestic economy, and prints money to place into that account (say, \$100 Billion). It is crucial that this money *not circulate domestically at first, as it would cause inflation*. The purpose of this \$100B Sovereign Venture Fund is to invest in startups worldwide that might be disrupting New Zealand's domestic industries. This model is extremely effective and flexible, as :

- i) The money was not taken from New Zealand taxpayers, but rather generated for free by the New Zealand Central Bank. Hence, it can invest in speculative startups across the world with far more boldness.
- ii) The diversification achieved is immediate, and can always be adjusted with equal immediacy as needed.

- iii) The Fund is leveraging the rest of the world's technological deflation for New Zealand's domestic benefit.
- iv) Tech startups worldwide become extremely vocal advocates for the fund, and even the country itself. It boosts New Zealand's branding (generating even more tourism).
- v) Fund gains can be used to offset government spending by replacement of income tax, or to fund training to enable citizens to modernize their skills. It can also provide a greater social safety net to cushion industries buffeted by disruption, but without taxing those who are still working. This is how to repatriate the money without inflation.
- vi) Even a larger fund of \$800B can earn \$80B/year from a 10% return, which exceeds the total taxes collected by the country.

The Sovereign Venture Fund is an extremely effective, speedy, and versatile method of economic diversification. It can be customized for any prosperous country (for example, an oil exporter should simply invest in electric vehicle, battery, and photovoltaic technologies to hedge their economic profile). As a huge amount of worldwide QE has to be done just to offset technological deflation, there is no contribution to inflation even worldwide, let alone domestically. As the winds of technological change shift, the Fund can respond almost immediately (unlike a multi-decade process of creating a tech startup ecosystem only to worry if the sectors represented are about to be disrupted).

Since there is a very high and exponentially rising ceiling of how much world QE can be done before world inflation reaches even 3% (about \$400B/month in 2018, as per my calculations), there is an immense first-mover advantage that is possible here. The first \$1 Trillion is effectively 'free money' for the country that decides to be Spartacus.

New Zealand, in particular, has even more factors that make it a great candidate. The NZ\$ is currently too strong, which is crimping New Zealand's exports. This sort of program may create a bit of currency weakening just from the initial reaction. For this additional reason, it is a low-risk, high-return strategy for generating a robust and indeed indestructible safety net for New Zealand's citizens, hedging them from the winds of global technological disruption.

Related ATOM Chapters :

[Chapter 4 : The Overlooked Economics of Technology](#)

[Chapter 10 : Implementation of the ATOM Age for Nations](#)

ATOM Award of the Month, May 2018

The Futurist · 29 May 2018 · Archived copy · Original

For the May 2018 ATOM AotM, we will visit a technology that is not a distinct product or company, but rather is a feature of consumer commerce that we would now find impossible to live without. This humble yet indispensable characteristic of multiple websites has saved an incalculable amount of frustration and productivity loss. I am, of course, referring to web-based reviews.



Lest you think this is a relatively minor technology to award an ATOM AotM to, think again, for a core principle of technological progress is that a technology is most successful when it is barely even noticed despite a ubiquitous presence.

Part of what has enabled eCommerce to siphon away an ever-rising portion of brick and mortar retail's revenue is the presence of reviews on sites like Amazon. Beyond eCommerce, sites like Yelp have greatly increased the information access of consumers seeking to patronize a low-tech business, while media sites permit a consumer to quickly decide which films and video games are worthwhile without risking a blind purchase. While false reviews were a feature of the early Internet for over a decade, now there is considerable ability to filter those out.

I recall a frustrating episode that a friend and I experienced in 1999. We wanted to rent a film from Blockbuster videos, but did not know which one. We found one that had familiar actors, but the movie was extremely subpar, resulting in a sunk cost of the rental fee, transportation costs, and time spent on the film and two-way transit. When returning to Blockbuster to discharge the VHS Cassette of the film, we selected another, based on the same criteria. It was even worse. We had rented two separate films over two separate round trips to Blockbuster, only to be extremely unsatisfied. Movie review sites like IMDB did exist at the time, but my friend did not have home Internet access (as his Internet activities were restricted to his workplace, as was common at the time).

Now, in this anecdote, just list the number of **ATOM** disruptions that have transpired since :

1. There is no longer a 'Blockbuster Video' that rents VHS Cassettes, as films are rented online or available through a Netflix subscription.
2. Everyone has home Internet access, and can see a film's reviews before ever leaving home.

Hence, it is no longer possible to waste hours of time and several dollars on a bad film. The same goes for restaurants, and in this case, both the consumer and the business are shielded from an information mismatch on the part of the consumer. I have always felt that it was unfair for a patron to judge a restaurant negatively if they themselves did not order what they might have liked. Now, with Yelp, in addition to reviews, there are pictures, enabling a vastly more informed decision.

Even higher-stakes decisions, such as the selection of a dentist or auto-mechanic, has slashed the uncertainty that people lived under just 12 years ago. The better vendors attract more business, while substandard (or worse - unethical) vendors have been exposed to the light of day. This is a more powerful form of quality control than has ever existed before.

Now, to see where the real ATOM effects are found, consider the value of the data being aggregated. This drives better product design and better marketing. This also expands the roadmaps of accessory products or complementary products. The data itself begins to fuel artificial intelligence, for remember that any pile of data of sufficient size tends to attract artificial intelligence to it. This leads to a lot of valuable analytics and automation.

If one were to rank the primary successful Internet use cases to date, the ability to see reviews of products and services would rank very high on the list. For this reason, this receives the May 2018 ATOM AotM.

Economic Trendline Reversion Does Not Happen Evenly

The Futurist · 10 July 2018 · Archived copy · Original

If we could point to one aspect that makes the modern era different from centuries past, the premier candidate for that distinction is how the centuries-established exponential, accelerating trend of technological progress manifests in economics, and the fact that the trendline is now in a steep upward trajectory. These are all worldwide metrics, and have to be. But if one examines the components, the variance contained therein is immense.

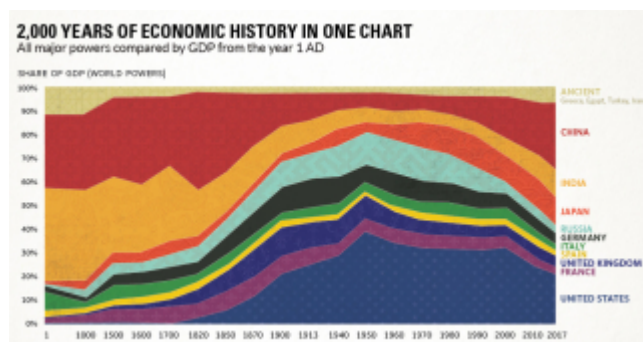
Nominal GDP, Current US\$, Trillions			
Country	2007	2017	Gain (%)
US	14.48	19.39	34%
China	3.55	12.24	245%
India	1.2	2.6	117%
UK	3.07	2.62	-15%
Japan	4.52	4.88	8%
Eurozone	14.11	12.59	-11%
World	57.83	80.68	40%

One table that I use relatively often is the one that depicts relative GDP gain by country, and have in the past used it to describe how the 2008-09 crisis led to the rebound happening elsewhere. Google has just updated its economic data engine for 2017, enabling a full decade to be included from the start of the prior crisis. This enables us to see what happens when the global economy experiences a major dislocation. The Great Depression (1929-39) was one such dislocation, and while the trendline is too steep today for a downturn of similar duration to manifest in the global economy, the more recent dislocation was almost as dramatic in terms of how it reoriented the tectonic plates of the global economy.

From the table, we see that the World Economy grew by 40% in Nominal GDP. We do not adjust for inflation in these metrics for reasons detailed in the [ATOM publication](#), and we take the US\$ metric as universal.

The US, remarkably, did not grow at a much slower rate than the world average, and hence has not yet experienced a substantial proportional shrinkage. By contrast, the rest of the advanced world has scarcely grown at all, while European economies have outright shrunk. An advanced country, of course, does not have the same set of factors to contend with as an emerging economy that is at a stage where high growth is easier, hence this is really two tables in one. India's underperformance relative to China is just as substandard as the UK's underperformance relative to the US.

China has effectively dominated the entire world's growth. China has grown at an astounding 245%, partly due to a structural strengthening of its currency, which itself is partly due to their more advanced understanding of technological deflation and the monetization of such through their central bank (as per the ATOM concepts). India has not experienced any such strengthening of its currency (quite the opposite, in fact), which is why India's economy has grown at a far slower rate despite starting from a very low base.



Consider this other chart, of GDP distribution by country (as per the current borders) from the year 1 until 2017. The growth of China (and to a lesser extent, India) appears to be a reversion to a status quo that existed from the dawn of civilization all the way until the early 19th century.

If this factor is combined with the exponential trend of world growth, then China's current outperformance seems less like an aberration.

This begs the question of what the next decade will look like. There is almost no chance that China can outperform the RoW by the same magnitude from this point onwards, simply due to the RoW no longer being large enough to manage the same intake of Chinese exports relative to China's size as before. But will the convergence take the form of China slowing down or the RoW speeding up? Will India experience the same convergence to pre-19th century proportional size, or is India a lost cause?

Under the **ATOM program**, it could certainly be the latter, since the advanced economies already have enough technological deflation that they can monetize it through central bank monetary creation. China, by contrast, will not be technologically dense enough for it until 2024 or so. The US could rise to 5-6%/year Real GDP growth by 2025.

The current mindset in the Economics profession is vastly outdated, and there is little to no curiosity about accelerating economic growth rates, or about the relationship between technological deflation and central bank monetary action. If China can no longer be an outlet to accommodate the entirety of the trendline reversion force that is seeking to work around these obstructions, then explosive growth combined with chaotic disruption will happen somewhere else.

Related ATOM Chapters :

2. The Exponential Trendline of Economic Growth

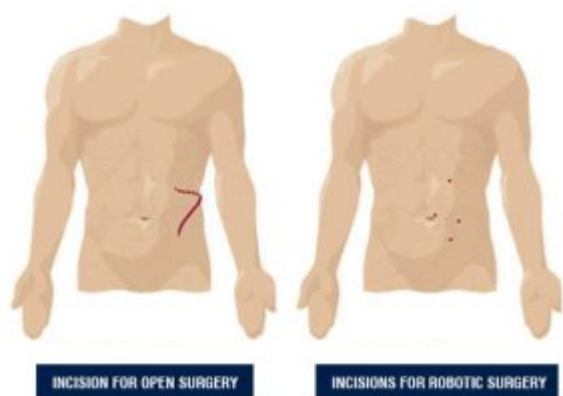
ATOM Award of the Month, October 2018

The Futurist · 11 October 2018 · Archived copy · Original

For this month's **ATOM AotM**, we visit the medical industry, and examine a technology that seems quite intuitive, but on account of patents and other obstacles, has seen rapid improvement greatly delayed until now.



Surgery seems as though robotics would be ideally suited for it, since it combines complexity and precision with a great deal of repetition of well-established steps. The value of smaller incisions, fewer instances of bones being sawed, etc. is indisputable, from qualitative measures such as healing pain, to tangible economic metrics such as hospital stay duration post-surgery.



Intuitive Surgical released its Da Vinci robot to the market in 2001, but on account of Intuitive's patents, they sustained a monopoly and did not improve the product much over the subsequent 17 years. Under **ATOM principles**, this is a highly objectionable practice, even if technically they can still earn a high profit margin without any product redesigns. As a result, only 4000 such robots are currently in use, mostly in the US. Intuitive has achieved a market capitalization of over \$60 Billion, so it has succeeded as a business, but this may soon change. Now that Intuitive's patents are finally close to expiry, a number of competitors are ready to introduce ATOM-consistent exponential improvements into the competitive landscape.

The Economist has a detailed article about the new entrants into this market, and the innovations they have created. In addition to mere cost-reduction due to smaller electronics, one obvious extension of the robotic surgery model is for each robot to be connected to the cloud, where the record of each surgery trains an Artificial Intelligence to ensure ever-improving automation for several steps of the surgery. With AI, greater usage makes it improve, and when thousands of surgeries around the world are all recorded, that makes *each* machine simultaneously better. As costs lower and unit volume increases, the volume of data generated rises. As the accumulation of data rises, the valuation of companies capturing this data also rises, as we have seen in most other areas of technology.

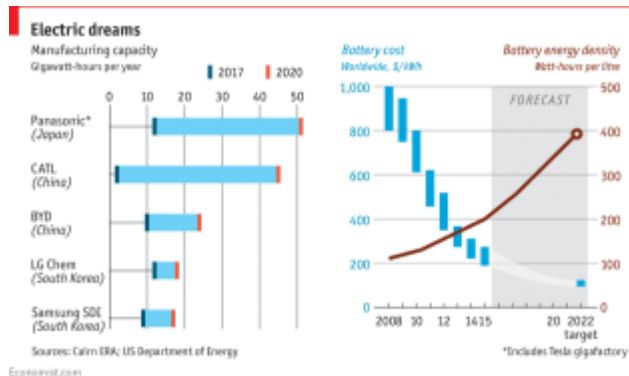
This level of data combined with greater circuitry within the robot itself can also increase the speed of surgery.

When more of it is automated, and the surgeon is doing less of the direct manipulation, then what is to prevent surgeries from being done at twice or thrice the speed? This enables a much shorter duration of anesthesia, and hence fewer complications from it.

ATOM Award of the Month, December 2018

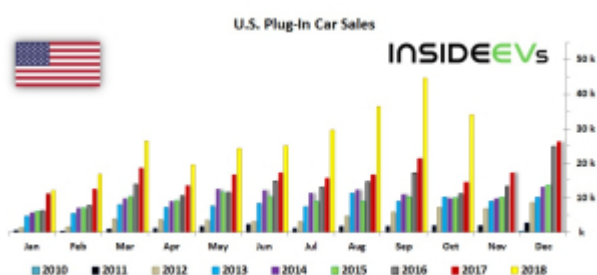
The Futurist · 10 December 2018 · Archived copy · Original

It is time for another ATOM AotM. This month, we return to the energy sector, for it is where the greatest size and scale of ATOM disruptions are currently underway.



We visited batteries briefly in [August 2017's ATOM AotM](#). There are two exponentials here, battery cost per unit of energy, and battery energy density per unit volume. Hence, despite 40 years of apparent stagnation interspersed with angst about how electric vehicles failed to arrive in response to 1973 and 1981 oil spikes, the exponential trend quietly progressed towards the inflection point that we have arrived at. True to the exponential nature of technology, more progress happened in 2011-20 than 1970-2010, and we now have viable electric vehicles that are selling rapidly and are set to displace gasoline consumption in a matter of just a few short years. Electric vehicles are now 2% of all new vehicle sales in the US, and 3% worldwide, with a high annual growth rate. Due to the rapid cost improvements in EVs expected in the next three years, a substantial tipping point is perhaps no more than three years away.

This rapid rise is in the face of two major headwinds : the low price of oil ([due to another ATOM disruption](#)), and the high price of EVs (the top-seller in units is a \$50,000 vehicle). It is now a certainty that once a high-quality EV becomes available at the \$30,000 pricepoint, the speed of displacement will be startling.



A tracker that records monthly sales at both US and WW levels is [here](#). The speed of advancement merits monthly visits to this tracker, at this point. Note that over time, the US is actually where total displacement of ICEs by EVs will be the slowest, since other countries are more suited for EVs than the US (they have higher gasoline prices, and often 220V electrical outlets that lead to faster charging). In fact, a suddenly popular home upgrade in the US is, ironically, the installation of 220V outlets in the garage, specifically for EV charging.

As an example of a true ATOM disruption, the transformation will be multi-layered. From oil import/export balances, to gasoline refinement and distribution networks, to the reduction of near-slave labor from the Subcontinent forced to find work in Gulf petrostates, to mechanics dependent on ICE vehicle malfunctions, to surplus used ICEs unable to sell and thus forced to slash prices, to power management and pricing by electric utilities, to prime land occupied by gas stations, a variety of status quos will end.

Don't underestimate how soon the domino effect will take place. Once EVs are sufficiently mainstreamed in the luxury car market (which is set to happen in 2019), then the entire range of urban commercial/government vehicles

will swiftly transition to electric. The US has 800,000 police cars, 210,000 USPS vans, and a variety of other government vehicles. On top of that, private enterprises include 110,000 UPS vehicles, 60,000 FedEx vehicles, and perhaps over 300,000 pizza delivery vehicles. As these transition, observe how many gasoline stations shutter.

The much greater lifespan of EVs relative to ICE's will be one of the four factors that lead to the majority of automobile use migrating to an on-demand, autonomous vehicle model by 2032, [as discussed before](#).

Related :

[The End of Petrotyranny](#)

[Why I Want Oil to be \\$120/Barrel](#)

Related ATOM Chapters :

3. [Technological Disruption is Pervasive and Deepening.](#)

ATOM-like Thought Elsewhere

The Futurist · 27 January 2019 · Archived copy · Original

Commenter Geoman alerted me to a lengthy article at Seeking Alpha by Ramy Taraboulsi. It is spread across 29 different pages, and thus not the most suited to that format. I have been reading it, and the similarities with the ATOM publication are many.

Given its length, I want to get some more eyeballs on it, so I hope that some of my readers here can examine it and point out salient differences, and possible points that might strengthen the ATOM publication. I don't want to bias readers with any comments before they read it themselves.

This coincides with my intention to update it for 2019 with the two major new ideas that have emerged since initial publication (the Sovereign Venture Fund and Monetization of Data generated through DUES spending). There is room for incorporation of other suitable ideas as well, if sufficiently stress-tested.

I had a new article for the February 2019 ATOM AotM completed and ready to go, but I want to hold off on that for a bit until I get some more readers' comments on Ramy Taraboulsi's article.

ATOM Award of the Month, February 2019

The Futurist · 1 February 2019 · Archived copy · Original

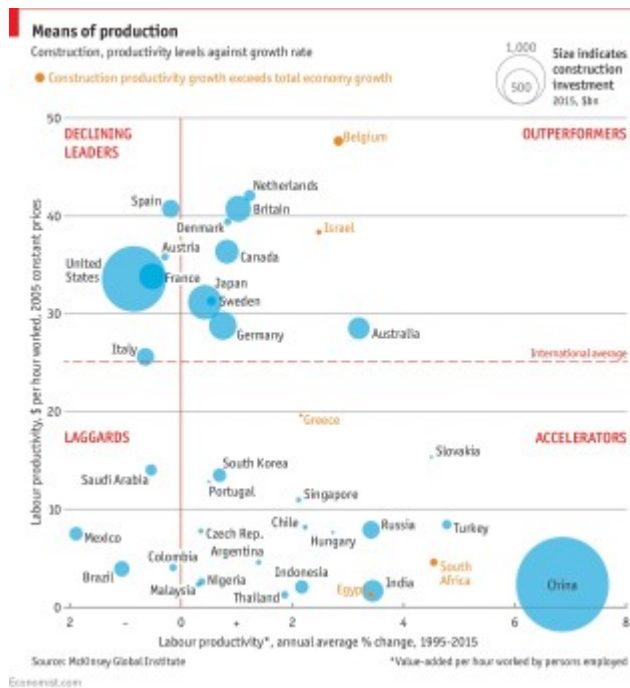


Economist.com

For this month's **ATOM AotM**, we examine something that even the rest of the technology industry has virtually no awareness of, and the US public is entirely oblivious of, even though we have a President from the construction industry.

The US construction industry has had no net productivity gain in the last 70 years. Even worse, it declined by 50% over the last 50 years. Construction should be seen as a type of manufacturing, as most construction is not devoted to anything highly customized or unusually complex. Yet, manufacturing itself has risen in productivity by 800% over the same period that construction has not risen at all. A combination of organized crime, government graft, and an anti-productivity ethos have contributed to this epic failure.

Given that construction is about 7% of the US economy, this is troubling. Imagine if that 7% was 16x more productive (i.e. merely keeping up with manufacturing). Americans, particularly urban Americans, don't realize that they could have thrice the square footage for the same price if this sector merely kept up with manufacturing. There would also be several hundred thousand more jobs in construction, and much broader home ownership.



Meanwhile, outside of the many biases of the Western media, there is an amazing example of supreme construction efficiency. China has grown at 7% a year over the last 20 years, even as the US has shrunk at -1% a year (click image to enlarge). The productivity of China has greatly enlarged the size of its construction sector, to the extent that it is 20% of China's economy vs. just 7% in the US. While the two countries are at different stages of growth and China is still at a much lower absolute level, the differential is still immense.

Normally, in any industry, such an immense productivity differential leads to the productive country exporting products to the less productive country, swiftly driving local unproductive businesses to their deserved demise. Construction, however, produces a product that is not transportable, so a productivity normalization has not happened. At least not yet. But this high of a differential eventually finds a way to engineer a normalization. Modular construction is one method where parts are manufactured, and then assembled on site. China could start exporting this to the rest of the world.

Here is a [Spire Research report on the advances in China's construction technology](#).

The Western media, in its hubris, is quite willing to criticize China for building entire cities 10 years before they are needed. How often have we seen stories about empty cities in China that take a few years to fill up? By contrast, the United States (and California in particular) does something much worse, which is to build structures 20 years *after* they are needed. Given the choice between these two schedule misalignments, China's approach is vastly preferable.



Economist.com

Beyond this, the costs of US ineptitude are about to become more problematic. The eCommerce revolution is exposing the massive misallocation of land toward retail space, that is a uniquely American distortion. Part of this is due to a peculiar depreciation schedule in the tax code originating in 1954. The abundant land in the US interior led to the same lopsided usage of land in California, leading to the grotesque situation we have today where ultra-expensive housing resides next to vast, empty parking lots. High California housing prices are the product of extreme artificial supply restriction, aided by low construction productivity that ensures an apartment complex takes three years to complete, where the same in China takes under one year.

Dramatic photos of dead malls can easily evoke emotions in the average American, who has been trained to think this sort of retail experience is normal. But charts that reveal the unique extent of US profligacy with regards to retail land reveals a much more logical sequence of impending events. As eCommerce continues to shutter brick and mortar retail, there will be a rising groundswell of pressure to repurpose this land for a more contemporary use. Unfortunately, the inadequate level of US construction productivity threatens to greatly delay this conversion, severely damaging our national competitiveness relative to China.



Economist.com

On the subject of where the US may see China catch up, most of the focus is on Artificial Intelligence, Quantum Computing, and other high-concept technologies. Yet the construction productivity differential alone represents the single biggest sectoral deficit from the point of view of the US and many other countries. China is well-positioned to dominate the entire construction industry worldwide once it can more easily win international contracts and transplant its productivity practices abroad. If the US blocks Chinese construction imports, other countries across the world will happily partake in these high-quality end

products. This should be welcomed by anyone with a free-market bent.

For this reason, China's construction sector, in breaking the low-productivity pattern seen in almost the entire rest of the world, is the recipient of the February 2019 ATOM AotM.

ATOM Award of the Month, April 2019

The Futurist · 1 April 2019 · Archived copy · Original



For this month's **ATOM AotM**, we return to the familiar, but in the process, we want to recognize an **ATOM** trend that has not gotten as much credit as it has deserved.

We all know what Moore's Law is, and what has been enabled by it. But what has always been amazing to me is how little recognition a similar law has received. Storage capacity has risen at a rate equal to (or slightly higher than) Moore's Law. It is not a technological byproduct of Moore's Law, as it has always been worked on by different people in different companies with different technical talents.

If storage capacity were not improving at the same rate as Moore's Law, most computer-type products would not have continued to produce decades of viable new iterations. From PCs to Smartphones to Video Game consoles, all have a storage requirement that has to match up to the size and number of files downloaded and processed. Correspondingly, data transfer speeds have also had to rise (USB 1.0 to 2.0 to 3.0, Ethernet to Fast Ethernet to Gigabit Ethernet, etc.). A 2019-era PC could not have a 2006-era hard drive and be very useful.



Like Moore's Law, the exponential doubling has spanned a sequence of technologies that all sustain the underlying megatrend, from internal spinning hard drives, to flash storage, to storage in the cloud. Greater density has been matched by shrinking weight per unit storage and less power consumption. This also means that has computing decouples from Moore's Law and moves into different (and probably faster) forms of exponential growth, storage will almost certainly also follow suit. DNA-based storage is a prospective technology that has many attributes comparable to expected future computing technologies such as Quantum Computing.

Unlike Moore's Law, storage has not always advanced at a steady rate. There are times when it advanced much faster than Moore's Law, and times when it advanced much slower (such as in recent years). The 40-year average, however, does appear to match Moore's Law's doubling rate rather closely, and hence what one dollar purchases today is the same as what one billion dollars could purchase then, which itself would have been the size of a house.

Also unlike Moore's Law, there is not a universally-accepted name associated with this trend. **Mark Kryder** is sometimes given this attribute, but he did not put forth a prediction early enough for it to be a prediction by any

measure (Kryder officially spoke of this in 2005 whereas Moore made his prediction in 1965), his name is not mentioned in any of Ray Kurzweil's writings or other publications, and since he was not the founder of a major storage company, he is not analogous to Gordon Moore.

As rising storage efficiency is crucial towards the productization of any other form of computing product (including Smartphones), it deserves recognition for its contribution to the technological age, despite often being overlooked in favor of Moore's Law.

Related ATOM Chapters :

3. Technological Disruption is Pervasive and Deepening

The Federal Reserve Continues to Get it Wrong

The Futurist · 18 May 2019 · Archived copy · Original



The most recent employment report revealed 279,000 new jobs (including revisions to prior months), and an unemployment rate of just 3.6%, which is a 50-year low. Lest anyone think that this month was an anomaly, the last 12 months have registered about 2.6M new jobs (click to enlarge).

Over the last two years, the Federal Reserve, still using economic paradigms from decades ago, assumed that when unemployment goes below 5.0%, inflation would emerge. With this expectation, they proceeded on two economy-damaging measures : raising the FF rate and Quantitative Tightening (i.e. reversal of Quantitative Easing, to the tune of \$50B/month).

As the Fed raised the Fed Funds rate all the way up from the appropriate 0% to the far-too-high 2.5%, the yield on the 10-year note is still 2.1%, resulting in a **negative yield curve**. Similarly, inflation continues to remain muted, even after \$23 Trillion and counting of worldwide QE, as I have often pointed out.

Yet, the Federal Reserve STILL wanted to raise interest rates, **in direct violation of their own supposed principles regarding both the yield curve and existing inflation**. They were exposed as looking at **only one indicator** : the unemployment rate. Their actions reveal that they think that a low unemployment rate presages inflation, and no other indicator matters.

Now, for the big question : Why do they think any UE rate under 5.0% leads to inflation, and why are they getting it so wrong now?

The answer is because back in the 1950-80 period, too many people having jobs led to excess demand for materially heavy items (cars, houses, etc.). In those days, there was far too little deflationary technology to affect traditional statistics.

Today, people still buy these things, but a certain portion of their consumption (say, 2%) comprises of software. Software consumes vastly less physical matter to deploy and operate, **and never 'runs out of supply', particularly now in the download/streaming era**. If Netflix had 10 million new people sign up tomorrow, the cost of servicing them would be very little, and the time spent to sign up all of the new customers would also be negligible. This is not hard to understand at all, except for those who 'know so much that isn't so'. The Federal Reserve has over 600 PhDs, but if they all just cling to the same outdated models and look at just ONE indicator, having 600 PhDs is no better than having one PhD (and, in this case, worse than having zero PhDs).

But alas, the Federal Reserve, (and by extension, most PhD macroeconomists) just cannot adjust to this 21st-century economic reality, even if they cannot explain the lack of inflation, and are incurious about why this is.

They are afflicted with a level of 'egghead' groupthink the likes of which exceeds what exists in any other major field today. When this happens, we are often on the brink of a major historical turning point. Analogous situations in the past were when the majority of mechanical engineers in the 1880s insisted that heavier-than-air flying machines large enough to carry even a single human were not possible, and when pre-Copernican astronomers believed the Sun revolved around the Earth.

The percentage of the total economy that is converging into high-tech (and hence high-deflation) technologies is rising, and is now up to 2.5-3.0% of total world GDP. This disconnect can only widen.

President Trump, seeing what is obvious here, has not just pressured the Federal Reserve to stop raising rates (which they were about to do in late 2018, which would have created the inverted yield curve that they supposedly consider to be troubling), **but has recently said that the Fed should lower the Fed Funds rate by 1%, effectively saying that their last four rate hikes were ill-considered.** He rightfully flipped the script on them.

Now, normally I would be the first to say a head of state should not pressure a central bank in any way, but in this particular case, the President is correct, and the ivory-tower is wrong. The correct outcome through the wrong channel is not ideal, but the alternative is a **needless** recession that damages the financial well-being of hundreds of millions of people, and destroys millions of jobs. He is right to push back on this, and anyone who cares about jobs must hope he can halt and reverse their damage-causing trajectory.

In this vein, I urge everyone who is on board with the ATOM concepts, and who wishes to avoid an entirely needless recession, to send polite emails to the Federal Reserve Board of Governors, with a request that they look at the ATOM publication and correct their outdated grasp of monetary effects from liquidity programs, and the necessity of modernizing the field of macroeconomics for the technological age. The website via which to contact them is here :

<https://www.federalreserve.gov/aboutthefed/contact-us-topics.htm>



We are at a crucial juncture in the history of macroeconomics, the economics of technology, and the entire concept of jobs and employment. It is a matter of time before a Presidential candidate stands before a cheering audience and points out how trillions of QE were done, but none of the people in the audience got a single dime. Imagine such a candidate simply firing up the audience with queries of **"Did you get a QE check? Did you get a QE check? ?Usted recibiste un QE cheque?"** That could be a political meme that gains very rapid momentum.

This is how a version of UBI will eventually happen. We, of course, call it something better : **DUES (Direct Universal Exponential Stipend).**

The question is, when least expected, such a leader will emerge (probably not in the US), to transition us to this era

of new economic realities. It will certainly be someone from the tech industry (the greatest concentration of people who 'get it' regarding what I have just elaborated above). Who will be that leader? A major juncture of history is on the horizon. All roads lead to the **ATOM**.

Related ATOM Chapters :

4. The Overlooked Economics of Technology

6. Current Government Policy Will Soon be Ineffective

10. Implementation of the ATOM Age for Nations

Could it Be? Have We Gotten Through to the Federal Reserve?

The Futurist · 14 July 2019 · Archived copy · Original

Our persistence in contacting the Federal Reserve and urging them to educate themselves on why their outdated assumptions about macroeconomics are not resulting in the outcomes they predict has paid off. While there is no way of knowing which Federal Reserve Governor may have seen some of our emails, or if in fact it is due to our campaign at all, there has been a very sudden paradigm shift at the Federal Reserve on no less than three fronts.

According to this article from [CNBC](#), the Federal Reserve has suddenly accepted three points that are extremely familiar to readers of The Futurist and the [ATOM publication](#), but were anathema to the ivory tower orthodoxy of credentialed Macroeconomists.

- i) The Federal Reserve now admits that a low (3.7%) unemployment rate need not cause inflation, the way it might have in 1969-74.
- ii) The Federal Reserve now admits that the 'normal' Fed Funds rate may be lower than its previous assumption of 3% (it is actually 0%, but the Federal Reserve is at least moving in the right direction).
- iii) The Federal Reserve now admits that minimum possible unemployment is lower than the floor they previously assumed.

The fact that a body that rigidly disputed all of these notions until just last month has shifted so suddenly is an immense victory for the ATOM, and all of us who took the time to write to the Federal Reserve and teach them about the changes in their field. There is no profession more oblivious to how technology changes their field than Macroeconomists, and this stunning shift is a delight to see.

Now, it is time to update the ATOM Publication, for a version 2.0. The recession that we have been perilously close to the brink of from 2017-present (top-to-bottom takes 18-30 months), is now much more likely to be avoided. This is the first time since 2015 that that has been true.

Update (8/7/19) : The Federal reserve did indeed cut the Fed Funds rate by 0.25% to bring it down from 2.5% to 2.25%. More importantly, they also signaled an intention to halt Quantitative Tightening (QT), so as to increase net US QE from -\$50B/month to \$0 (thereby causing a net increase of \$50B/month in World QE). The 10-yr Treasury yield has since fallen to 1.6%, making the yield curve even more inverted than before. Naturally, the Fed Funds rate has to return to 0% just to create a normalized yield curve, and QE has to resume to create an effectively negative front end to restore a normal, 2-3% spread yield curve.

Related Articles by Chronology :

[Bond Yields Continue to Confirm ATOM Revelations](#), July 17, 2016

[The Federal Reserve Continues to Ignore Technological Deflation](#), September 22, 2016

[The Federal Reserve Continues to Get it Wrong](#), May 19, 2018

Timing the Singularity, v2.0

The Futurist · 20 August 2019 · Archived copy · Original

Exactly 10 years ago, I wrote an article presenting my own proprietary method for estimating the timeframe of the Technological Singularity. Since that time, the article has been cited widely as one of the important contributions to the field, and a primary source of rebuttal to those who think the event will be far sooner. What was, and still is, a challenge is that the mainstream continues to scoff at the very concept, whereas the most famous proponent of this concept persists with a prediction that will prove to be too soon, which will inevitably court blowback when his prediction does not come to pass. Now, the elapsed 10-year period represents 18-20% of the timeline since the publication of the original article, albeit only ~3% of the total technological progress expected within the period, on account of the accelerating rate of change. Now that we are considerably nearer to the predicted date, perhaps we can narrow the range of estimation somewhat, and provide other attributes of precision.

In order to see if I have to update my prediction, let us go through updates on each of the four methodologies one by one, of which mine is the final entry of the four.

1) Ray Kurzweil, the most famous evangelist for this concept, has estimated the Technological Singularity for 2045, and, as far as I know, is sticking with this date. Refer to the original article for reasons why this appeared incorrect in 2009, and what his biases leading to a selection of this date may be. As of 2019, it is increasingly obvious that 2045 is far too soon of a prediction date for a Technological Singularity (which is distinct from the 'pre-singularity' period I will define later). In reality, by 2045, while many aspects of technology and society will be vastly more advanced than today, there will still be several aspects that remain relatively unchanged and underwhelming to technology enthusiasts. Mr. Kurzweil is currently writing a new book, so we shall see if he changes the date or introduces other details around his prediction.

2) John Smart's prediction of 2060 ± 20 years from 2003 is consistent with mine. John is a brilliant, conscientious person and is less prone to let biases creep into his predictions than almost any other futurist. Hence, his 2003 assessment appears to be standing the test of time. [See his 2003 publication here for details.](#)

3) The 2063 date in the 1996 film *Star Trek : First Contact* portrays a form of technological singularity triggered from the effect that first contact with a benign, more advanced extraterrestrial civilization had on changing the direction of human society within the canon of the Star Trek franchise. For some reason, they chose 2063 rather than a date earlier or later, answering what was the biggest open question in the Star Trek timeline up to that point. This franchise, incidentally, does have a good track record of predictions for events 20-60 years after a particular Star Trek film or television episode is released. Interestingly, there has been exactly zero evidence of extraterrestrial intelligence in the last 10 years despite an 11x increase in the number of confirmed exoplanets. [This happens to be consistent with my separate prediction on that topic and its relation to the Technological Singularity.](#)

4) My own methodology, which also gave rise to the entire 'ATOM' set of ideas, is due for an evaluation and update. [Refer back to the concept of the 'prediction wall'](#), and how in the 1860s the horizon limit of visible trends was a century away, whereas in 2009 it was in perhaps 2040, or 31 years away. This 'wall' is the strongest evidence of accelerating change, and in 2019, it appears that the prediction wall has not moved 10 years further out in the elapsed interval. It is still no further than 2045, or just 26 years away. So in the last 10 years, the prediction wall has shrunk from 31 years to 26 years, or approximately 16%. As we get to 2045 itself, the prediction wall at that time might be just 10 years, and by 2050, perhaps just 5 years. As the definition of a Technological Singularity is when the prediction wall is almost zero, this provides another metric through which to arrive at a range of dates. These are estimations, but the prediction wall's distance has never risen or stayed the same. The period during which the prediction wall is under 10 years, particularly when Artificial Intelligence has an increasing role in prediction, might be termed as the 'pre-Singularity', which many people will mistake for the actual Technological Singularity.

Year of the Singularity		% of 2019 World GDP Merged into the ATOM		
		2	2.75	3.5
% Rate of Increase in ATOM Share of World GDP	6	2074	2069	2065
	7	2067	2062	2058
	8	2061	2057	2054

Through my old article, [The Impact of](#)

[Computing](#), which was the precursor of the entire [ATOM set of ideas](#), we can estimate the progress made since original publication. In 2009, I estimated that exponentially advancing (and deflation-causing) technologies were about 1.5% of World GDP, allowing for a range between 1% and 2%. 10 years later, I estimate that number to be somewhere between 2% and 3.5%. If we allow a newly updated range of 2.0-3.5% in the same table, and an estimate of the net growth of this diffusion in relation to the growth of the entire economy (Nominal GDP) as the same range between 6% and 8% (the revenue growth of the technology sector above NGDP), we get an updated table of when 50% of the World economy comprises of technologies advancing at Moore's Law-type rates.

We once again see these parameters deliver a series of years, with the median values arriving at around the same dates as aforementioned estimates. Taking all of these points in combination, we can predict the timing of the Singularity. **I hereby predict that the Technological Singularity will occur in :**

2062 ± 8 years

This is a much tighter range than we had estimated in the original article 10 years ago, even as the median value is almost exactly the same. We have effectively narrowed the previous 25-year window to just 16 years. It is also apparent that by Mr. Kurzweil's 2045 date, only 14-17% of World GDP will be infused with exponential technologies, which is nothing close to a true Technological Singularity.

So now we know the 'when' of the Singularity. We just don't know what happens immediately after it, nor can anyone with any certainty.

Related :

[Timing the Singularity, v1.0](#)

[The Impact of Computing](#)

[Are You Acceleration Aware?](#)

[Pre-Singularity Abundance Milestones](#)

[SETI and the Singularity](#)

Related ATOM Chapters :

[2 : The Exponential Trendline of Economic Growth](#)

[3 : Technological Disruption is Pervasive and Deepening](#)

4 : The Overlooked Economics of Technology

ATOM Award of the Month, November 2019

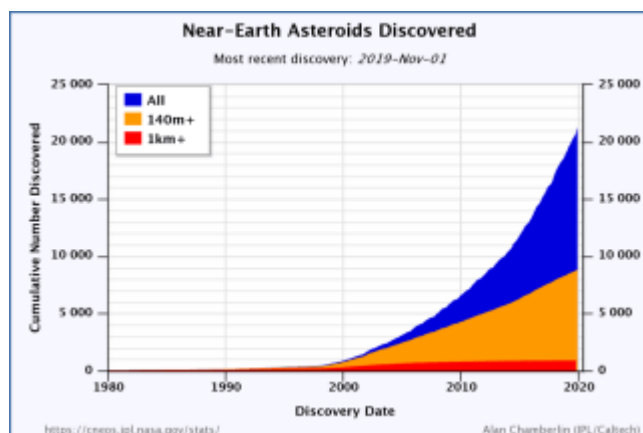
The Futurist · 1 November 2019 · Archived copy · Original

It is time for another **ATOM AotM**. This month's award has a major overlap with the **November 2017 award**, where we identified that telescopic power has been computerized, and as a result was rising at 26%/yr. This itself was a finding from **a much older article from all the way back in September 2006**, where I first identified that telescopic power was improving at that rate.



But how do better telescopes improve your life?

Learning about exoplanets and better images of stars are fun, but have no immediate relevance to our individual daily challenges. If you are not interested in astronomy, why should you care? Well, there is one area where this advancement has already improved millions and possibly billions of lives : we have now mapped nearly all of the **Near Earth Objects (NEOs)** that might be large enough to cause a major disaster if any of them strike the Earth. Remember that this is an object with a mass that may be billions of tons, traveling at about 30 km/sec (image from [sciencenews.org](https://www.sciencenews.org)), of which there are many thousands that have already orbited the sun over 4 billion times each.



All of us recall how, in the 1990s, there were a number of films portraying how such a disaster might manifest. Well, in the 1990s, we had little awareness of which objects were nearby at what time, and so there really was a risk that a large asteroid could hit us with little or no warning. However, as telescopes improved, 26%/yr (the square root of Moore's Law, since pixel numbers increase as a square of linear dimension shrinkage) got to work on this problem. Now, as of today, all asteroids larger than 1km are mapped, and almost all of the thousands that are larger than 140m (the size above which it would actually hit the surface, rather than burn up in the atmosphere) are mapped as well (chart from Wikipedia). We have identified which object might be an impact risk in what year. **In case you are wondering, there is a 370m asteroid that will get very near (but not hit the Earth) in 2036.** Of course, by 2036, we will have mapped everything with far more precision, at this rate of improvement. In other words, don't worry about an asteroid impact in the near future, as none of significance are anticipated in the next 17 years, and probably not for much longer than that. Comets are a different matter, as we have not mapped most of them (and cannot, as of yet), but large ones impact too infrequently to worry about.

Hence, the risk of an impact event, and mitigation thereof, is no longer a technological problem. It is merely a

political one. Will the governments of the world work to divert asteroids before one hits, or will they only react after one hits in order to prevent the next impact? These questions are complicated, as this problem is completely borderless. Why should the United States pay the majority of the expense for a borderless problem, particularly one that has a 71% chance of hitting an ocean? At any rate, this is another problem that went from deadly to merely one of fiscal prioritization, on account of ATOM progress.

More interestingly, within this problem is another major business opportunity that we have discussed here in the past. Asteroid mining is a potential industry that is simultaneous with asteroid diversion, as asteroid pulverization may waste some precious metals that can be captured. Many asteroids have a much greater proportion of precious metals than the Earth's surface does, since 'precious' metals are heavy and most of the quantity sunk to the center of the Earth while the Earth was forming, while an asteroid with much lower gravity has its precious metals more evenly distributed throughout its structure. There are already asteroids identified that have hundreds of tons of gold and platinum in them. Accessing these asteroids will, of course, crush the prices of these metals as traded on Earth (another ATOM effect we have seen elsewhere in other commodities), and may reduce gold to an industrial metal that is used in much the way copper is. This, of course, may enable new applications that are not cost-effective at the current prices of gold, platinum, palladium, etc. But that is a topic for another time.

Related :

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Comment of the Year - 2019

The Futurist · 22 December 2019 · Archived copy · Original

The nature of the subject matter covered here leads to relatively few commenters (even though readership is still over 200 visits/day), despite the extraordinary importance of subjects covered. Frankly, without commenter Geoman's quality + quantity of comments over the last decade plus, we would not be above minimum comments level for a viable commenter community.

I haven't thought about giving recognition for the best comment of a particular year in the past, but a comment several months ago has stood out as exceptional. At 1026 words, it is article-length in its own right. It is from commenter **HB** :

Kartik, Geoman,

Yes, status symbols and prop 13 may be contributing but the main reason for SV housing bubble inflation is regulatory.

In my view, the pivotal legislative change that made this possible happened subtly some decades ago (1970s) when California mandated the creation of regional planning powers (region-wide urban boundaries and such) enabling housing supply restrictions under the appealing name of "smart-growth", a marketing name for a host of housing supply restrictions which in reality is a pretty dumb suicidal move that voter-lemmings seem to easily embrace the world over. So now due to the regional planning committee powers the residents of Silicon Valley cannot only block new development in their own cities but, more importantly, can block the creation of even new cities in their entire commutable region, plus also block housing supply increases in neighboring cities. Were it not for that, some cities would see opportunity and break ranks and increase housing supply, or entire new cities would spring up nearby to be quickly populated by new residents from the rest of the country/world and professionals escaping SV housing prices. Businesses would then follow the migrating and expanding talent. But all this can -- and is-- blocked by the expanded California regional housing powers which have been populated by an enviro-NIMBY coalition, with many voters openly approving and even more voters silently consenting, as in the case of busy immigrants.

For example, one of the potent repressive housing supply restriction tools of "smart growth" is the ability of any minority to block developments that would benefit large majorities.

A small five person minority group of "native" established stay at home housewives, who lucked out and bought their SV houses in the seventies, who realize they got a good deal and want to freeze their good luck in time, who spend their ample idle time picking invasive weeds on some SV hillside, can go to city hall and block an entire housing project for two hundred or more immigrants or out of Valley Americans with thousands of times the productive modern world capacity compared to the five housewives. And, as Kartik points out, the two hundred immigrants and their families are too humble in their new environment and primarily too busy to go down to a city hall where the voice of the housing project blocker (by legislative design) has many times the power of the housing project promoter in the fist place. Also the five housewives have an immediate (short sighted in this case indeed) stake in blocking the project, while the immigrants' increased housing supply benefit (from the specific project) is much more vague and diluted -- yet just as real.

A typical similar aspect of these dynamics can be seen at the beginning of the development cycle. Farmer Bob, farmer Jay, farmer Ben, and farmer Don each own one hundred acre farms. Farmer Ben subdivides his land and sells it for housing, initially affordable. Five years later two hundred families move in the area. Five years later the residents create a "Save the Bob Jay and Don hillside coalition" and under California's *mandated* regional planning can -- and will -- block development on Bob's Jay's and Don's land who, after all, have become a small powerless minority against the holly enviro-nimby alliance of new residents. Suicidal policy

aside, one should also not overlook the fact that Bob's, Jay's and Don's land is de-facto in large part confiscated by a majority who does not want the three remaining farmers to do to their land what was done to build the very housing where the current newly established majority just started living in. Such theft is (or perhaps should according to some views) be protected from democracy by the constitution, but apparently, in practice it is not. Indeed, the main function of a constitution in a democracy is a rather broad contract to not screw each other when we get the majoritarian opportunity. At least that is in the American constitution. Without it the feeling that "some day, in some way, they will come for you too" breaks down societal trust, and the country becomes the basket case nation that is the rule in most of the world where developed nations are the exception -- and developed nations that at least match average world growth (i.e. they are not in decline) are an even rarer exception. Also, not coincidentally, our newly formed one hundred California households and the regional powers granted to them by the legislature can block an even bigger majority of, say, three hundred new very competent households from moving into their area from the Midwest or the rest of the world, thereby blocking the even bigger potential newcomer majority before they even get the chance to vote.

So Silicon Valley residents will continue their agonizing commutes from their cubicles to their crummy houses, during which long commutes they will dream of making another half million dollars at their cubicle (that is one million before taxes and deductions) so they can add another bedroom and bath to their old house. Now, mind you, these are supposed to be some of the select smartest people in the nation/world!

As is often typical, the roots of a region's decline are inconspicuously established in the success phase of the cycle, when they are hardly noticed. But predicting when exactly the decline starts is virtually impossible for everybody, except perhaps a few very enlightened and also perhaps lucky very intelligent people. Until then the fear of missing out keeps pushing most of us towards inflating the bubble and the eventual destruction of the very area we like.

Kartik mentions in his opening statement how odd it is that the technology industry has so little awareness of this. Indeed the general behavior of the electorate on this issue is completely irrational -- and suicidal. Talking about shooting yourself in the wallet.

Geoman's comment about his parents illustrates in many ways the case of those offspring that are priced out of the SV area -- and its potential opportunity -- which over a lifetime might have been many times over the parents' house cash out, especially in households with more than one child. This blocked migration, in turn, imparts an even larger missed opportunity on the rest of the world who would greatly benefit from the foregone increased innovation, and thus an even faster ATOM.

That is quite the epic comment, and you should [click on the link and read the whole thread above and below it as well for context](#). This sort of legislatively-derived resource misallocation, combined with low technological innovation in the construction and communication sectors, has caused this problematic state of affairs and delaying the puncturing of this bubble that has gone on longer than many of us expected. One could say that there are at least four technologies working against this sort of resource misallocation, but at the same time, the centralizing forces of being an economic hub also work in favor of ever-greater centralization.

Gems

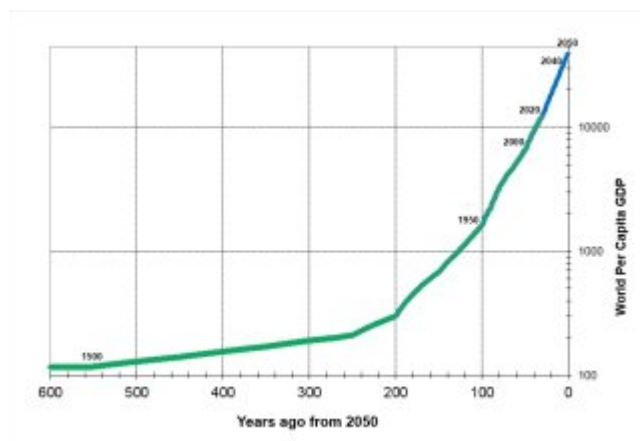
The Futurist · 1 January 2020 · Archived copy · Original

This is a publication in list format, rather than an integrated article. It is one of the most important concentrations of information you will ever read. If you are a thinking person, this publication will permanently change parts of your thinking, either from the points themselves or supporting material linked. We also have the legendary Imran Khan coming out of blogging retirement for a one-time-only appearance to provide his updates to his tens of thousands of fans, along with some other observations along the way in a dedicated section, since there are hundreds of thousands of people awaiting his sequel to his magnum opus article.

There is probably no human being alive that will fully agree or fully disagree with this entire article (and we certainly don't fully agree with each other). Each of our opinions are exclusively our own. We aim to evoke all possible emotions with near simultaneous combination, as well as to observe the effect of combining so many audiences at once. This publication is going to change the trajectory of society itself in small but distinct ways.

By Kartik Gada :

1) The Economy :



- a) There is no subject that affects more people, yet has so little written about it, **as the exponential, accelerating trend in economic progress**. It affects everything, yet under five people (including me) have written anything substantive about it in the last 12+ years.
- b) Half of all economic growth that has ever happened, has happened after 1998. This, too, is only if one takes the suboptimal metric of GDP as the measurement. If asset price growth net of inflation is taken as the metric, then half of all economic growth that has ever happened, has happened after 2010.
- c) **The US Federal Reserve, and by extension the entire profession of Macroeconomics, is so completely out of date in terms of how technological forces have changed their assumptions**, that what is blindingly obvious to people outside of their ivory tower is still submerged by their denial. There is no other field where the establishment is this out of touch with changes in their own field, and thus no field with a higher 'egghead' quotient. Major historical turning points often follow the collapse of such an existing stronghold of outdated orthodoxy.
- d) The US Federal Reserve still thinks Quantitative Easing was to be a temporary program, and that the 'normal' Fed Funds rate is around 3%, despite nearly a decade of being wrong about this. In reality, the Fed Funds rate will eventually be nearly 0% permanently, and QE will also be permanent (and at exponentially rising levels) in order to simulate the effect of negative interest rates. There are already \$16 Trillion worth of bonds with negative yields, and either this figure will rise or the level of worldwide QE will.

e) The Federal Reserve, with their army of 600 PhDs, has been exposed as not even looking at metrics they have touted in the past, such as the yield curve and the CPI inflation rate. It was revealed that they base their decisions on just one metric, which is the unemployment rate. They think that when the unemployment rate goes below 5.0% and then 4.0%, high inflation is imminent (just because that happened in 1969, long before technology was a significant part of the economy), so the Federal Reserve raised rates despite no evidence of inflation and in complete violation of their own states priorities regarding the yield curve. 600 PhDs is thus no better than having one PhD (which apparently is worse than having zero PhDs), when the only thing they can ever imagine is tinkering along the edges. They are the ideological successors of the 1900-era engineering establishment that insisted that heavier-than-air flying machines are not possible.

f) It is extremely easy for even a teenager to understand what ivory tower Economists with their PhDs don't, about why very low unemployment combined with QE has still not caused inflation. In 1969, when so many people had jobs, they bought houses and cars, which are materially intensive to build, and so shortages led to bidding wars among buyers. But now, if just 2% of one's consumption is software (vs. 0% in 1969), that is enough to offset inflation since software has no material component so can never run out of supply or experience inventory or distribution mismatches. It is that simple, but the Economics profession has memorized too much 1969-era material to retool their thinking.

g) Economists who devise policy do not interact with actual entrepreneurs and investors, except in highly orchestrated, limited ways analogous to how visitors at the zoo look at the confined animals for a few minutes per exhibit. That is why they need an army of PhDs to figure out what a small restaurant owner already knows about the minimum wage law. The US would be in astronomically better shape if the Federal Reserve were instead run by a council of randomly selected small business owners, rather than Economics PhD eggheads. Plus, the business owners would not even have to be full-time at the Federal Reserve; they could just conference into a weekly conference call and cast their votes on monetary policy changes each week. Again, this would deliver vastly better results than the thousands of full-time, taxpayer funded staff at the Federal Reserve.

h) Industries where the positions of power are the most hereditary are entertainment, politics, academia, and asset management via private funds (Hedge Funds, Venture Capital Funds, etc.). For this reason, these industries are prime targets for technological disruption.

i) It has been statistically verified that all humans are connected within approximately six degrees of separation. What is even more evident is that almost all private wealth and decision-making authority regarding that wealth is connected within three degrees of separation. This will not change, as power is inherently zero-sum in a way that money is certainly not.

j) The best economic system, that creates the most prosperity for the greatest range of people, is a free-market system **that employs regulation to contain industries that profit in correlation with misery of others**. This is where America has lost the plot, as the words I have underlined above are crucial, and are not seen from either side of the debate. Every industry wants to grow, and there are industries that grow by spreading more misery (cancer management, the military-industrial complex, prisons, tort law, social media, opioids, high fructose corn syrup, big pharma, tax code complexity, etc.). The primary role of regulation is to contain this specific category of industries within a free-market system, as there should never be too great of a perverse incentive to profit from the misery of others. Once that is regulated and monitored, the free market system is the best one by far.

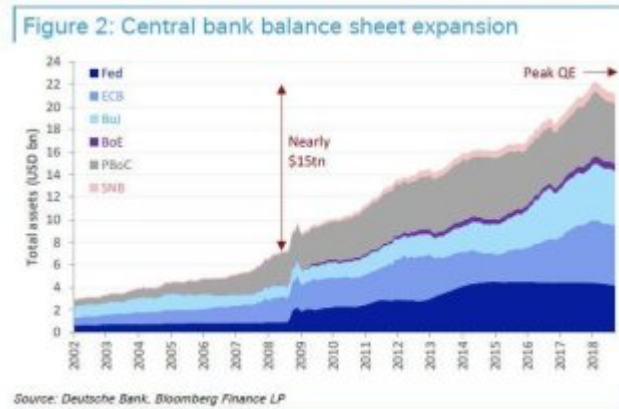
k) It is a tragedy **that job searches take longer today than they did 35 years ago**, despite the presence of email, the Internet, smartphones, and more. This is an example where technology has completely failed to improve the productivity of a process.

2) The ATOM :

a) The **fundamental thesis**, that QE-type programs to effectively 'print' money will no longer cause inflation due to

the technological deflation that offsets it, continues to be proven true. Most of the 'inflation' scaremongers have gone silent. Meanwhile, the **ATOM publication** has been read by over 400,000 people.

b) Even the US Federal Reserve, painfully incurious about changes to the field of macroeconomics, has been forced into compliance (albeit still without the updated understanding to navigate the modern economic landscape). **They have already been forced to reverse most of their ill-conceived 'Quantitative Tightening'.**



c) As of 1/1/2020, \$24 Trillion is worldwide QE has already been done, and about \$200B/month of additional QE is being added to that total as we speak. Almost no US or European economist circa 2012 thought there would still be any QE going on at all by now (and that it would have in fact been reversed). Rather, the number will be permanent and keep rising, as per the ATOM fundamentals. There is no 'peak' QE, contrary to the chart.

d) **The ever expanding frontier where low-tech gets converted to high-tech (as defined in the ATOM publication)** now is underway in dozens of individual industries and product categories at once. Many industries that were full of people who were not interested in technology have discovered, to their chagrin, that technology was nonetheless interested in them. Refer to the **Carnival of Creative Destruction**.

e) The **ATOM component of the world economy will rise from slightly under 3% today to about 6% on 1/1/2030.** That is a huge increase, making the amount of technological disruption happening in the world at that time far higher than is the case today.

f) The list of economic and technological practices and beliefs that people in the future (i.e. post-2035) will find odd about the early 21st century :

i) Back in the 1830s, when artificial refrigeration did not exist, transporting insulated blocks of ice from Boston to Calcutta (over 10,000 miles by sea) was a profitable business. Lest you laugh at this, **the practice of transporting hydrocarbon fuel from the Persian Gulf to Houston, Texas is equally absurd in terms of future technology, and will be seen as such by many people already alive today.**



Econeeet.com

ii) That the United States allocated millions of acres of land to retail shopping, over six times as much per capita as other Western countries, and greatly resisted the natural market forces to correct this distortion. This led to a weird, uneven cityscape in many major American metropolitan

areas.

iii) That 1.2 million people a year being killed in automobile accidents was considered normal.

iv) That there was a widespread belief that automation would create mass unemployment.

v) Every myth about scarcity fails to manifest, yet that does not stop such memes from emerging and being promoted by small-minded people. Everything from 'peak oil' to 'QE causes inflation' turned out to be wrong. As of 2020, we can no more experience a lengthy acute shortage in a need met by a material commodity than we can run out of atoms.

vi) That young people allowed themselves to go into debt to the tune of years worth of their future discretionary income, because employers required this just to gain a credential that allowed access to the middle tier of the employment market, even if the experience from a University degree has little to no bearing on success factors needed for an entry-level position (or at least did not contain skills that could not be learned elsewhere for free).

vii) That inflation was still a fear, and that it took so long for the ATOM set of ideas (i.e. transferral of taxation away from humans and onto technological deflation) took so long to be implemented, despite how obvious the solution was in hindsight.

viii) That a lengthy and expensive credential was considered to be a pre-requisite for participation in middle to higher tiers of the workforce, despite that credential doing very little to increase suitability for workforce participation.

ix) That there were such things as kidney dialysis, and kidney transplant wait lists, under which millions of people suffer daily.

x) That we taxed human output, without realizing that we could fund government by taxing the output of automation instead.

xi) That celebrities were paid vast sums of money to 'endorse' a product they don't even use, and that consumers are persuaded by this.

g) The smaller, less conspicuous examples of technological deflation and the resultant productivity enhancement are nonetheless immense when added up to a cumulative whole.

i) Video-based instruction is immensely valuable. The number of online videos that teach a viewer how to change the battery, brake pads, spark plugs, etc. of your specific car is impressive. These videos are far easier to follow than text-based manuals, and might reduce what may have been an expensive and inconvenient visit to a mechanic to under a fifth of the cost. Note that it is also easy to order the exact part you may need, which was not very easy before. The same goes for video instruction for cooking, filling out government forms, etc.

ii) The shift of consumer software consumption from buying boxed software in a retail store to downloading it online is immense. Everything from all the transport involved in stocking the store to the customer traveling to and from, to the ease of international distribution, to removal of the retailer margin, comprises a huge productivity gain all around. Note that GDP is calculated in a manner that does not reward this sort of productivity gain except in a very delayed and indirect way.

h) Automation always creates more jobs than it destroys, as long as the government does not make it too difficult to be an entrepreneur. Any job automated means the employer is saving that money, and new businesses that could not have broken even before now can. Despite years of scaremongering about net job loss from automation, the US unemployment rate happens to be at a 50-year low.

i) People don't realize **how much automobiles have improved**. For example, in the early 1980s, the Corvette was heavily featured in television and films as an impressive sportscar. **The 1982 Corvette had just 200 Horsepower**, comparable to compact sedans of 2020 which have thrice the fuel efficiency. The 2020 Corvette has over 500 _____

Horsepower in the base model, with premium models exceeding 750. Lifespans of cars have risen, and the need for maintenance has fallen (we no longer see those rainbow oil slicks in parking lots as was common in the 1980s).

j) The sheer quality and quantity of educational information available online for free is a sight to behold, making ignorance far less excusable than before. As just one example, if you want to become knowledgeable about [history](#), [astronomy](#), and [paleontology](#) in a short time, view the linked videos, pausing frequently to look up topics on Wikipedia. A further tool of astronomical literacy is [Celestia](#), which is also free. You can achieve a great leap within a single weekend. Speaking for myself, knowledge that took me thousands of hours to acquire in my youth (including begging my parents to take me to the library to check out books and return the old ones) could now be acquired in under 1/20th of the time and at lower cost. The savings worldwide are even greater when you account for the fact that most countries don't even have good public libraries.

k) The four-pronged disruption of the automobile experience was detailed in a prior article, [and I maintain that 2032 is when we will see most people eschewing car ownership to use self-driving Ubers, that are fully electric, and lead to a vast repurposing of defunct strip mall and parking lot land into something considerably more high-tech.](#)

l) [The Sovereign Venture Fund](#) is about \$2 Trillion of virtually 'free' money available to the first country that does it. The general concept is to capture the entire world's technological deflation for domestic benefit, before another country does it. After that, some agreement of division may have to be done, but the first \$2 Trillion is 'free'.

Year of the Singularity		% of 2019 World GDP Merged into the ATOM		
		2	2.75	3.5
% Rate of Increase in ATOM Share of World GDP	6	2074	2069	2065
	7	2067	2062	2058
	8	2061	2057	2054

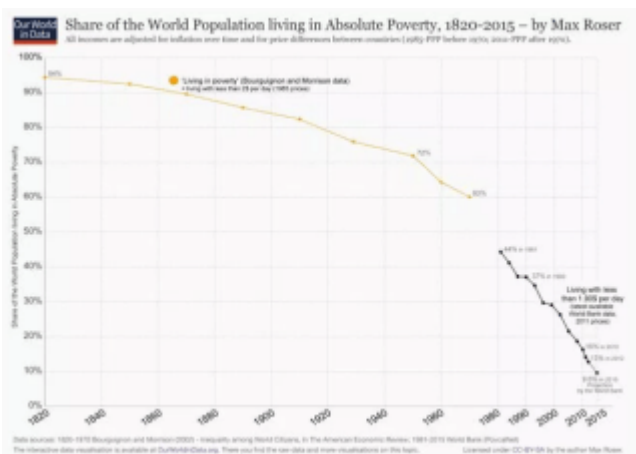
m) I estimate that [we will experience a Technological Singularity \(and hence an Economic one\) in 2062 ± 8 years.](#)

n) The **ATOM** is **not** Modern Monetary Theory. That is just socialism of another form, and makes no mention of technological deflation or the exponential rate of change. The ATOM set of ideas is something far more advanced, and is to MMT what a Model T is to a 2020 Lamborghini. Read the [ATOM FAQs here](#).

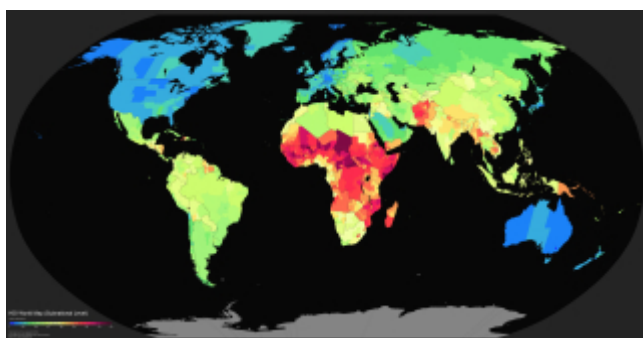
3) Human Progress :

a) Inequality is not what you think it is. [It has more to do with whether you were born in a sufficiently advanced era relative to your skillset and persona.](#)

b) The UN Human Development Index (HDI), either by accident or by design, never adjusts up the cutoff above which a country is considered 'High' prosperity. In 1980, there were barely a dozen countries in this category, but now, over 120 countries exceed the definition of what in 1980 was considered 'High Human Development'. That includes countries traditionally not considered prosperous (as they were not until very recently), such as Mexico and China.



c) Sub-Saharan Africa, and problematic pockets such as Haiti and Afghanistan, are among the very few countries that will still be 'poor' by 2030, at least as per the 1980 definition.



d) Too few people realize how a growing list of things that were unavailable even to billionaires a generation ago are now low cost or even free, which is another manifestation of ATOM principles. I have written about this in the past, and this continues to be true.

e) This chart (from hdi.globaldatalab.org) about Human Development by sub-national entity is very informative.

Will the inexorable prosperity curve hack down the remaining pockets of poverty, or are some places just too far gone?

f) People tend to assume that whatever they have seen in the middle 40 years of their lives is going to be permanent. Young people who have not yet entered this phase tend to overestimate the rate of change, while older people who have passed through this phase insist that all technological progress is overrated and no other societal factors will change. Both are incorrect.

g) "Throughout history, poverty is the normal condition of man. Advances which permit this norm to be exceeded — here and there, now and then — are the work of an extremely small minority, frequently despised, often condemned, and almost always opposed by all right-thinking people. Whenever this tiny minority is kept from creating, or (as sometimes happens) is driven out of a society, the people then slip back into abject poverty. This is known as "bad luck." - Robert Heinlein

4) Astronomy and the Space Age :

a) One of the great coincidences of our existence is that the Sun and the Moon have about the same apparent size when viewed from Earth. The Sun is 400 times greater in diameter, but is also 400 times further away. This makes perfect solar eclipses possible.



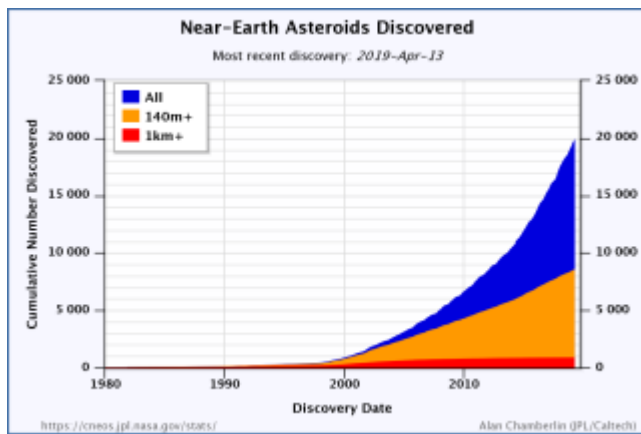
b) No one who knows anything about astronomy can possibly be troubled that **Pluto** has been demoted out of planethood status (it is now considered a 'dwarf planet' along with several other objects of similar size). Pluto has a mass less than 1/20th that of the next smallest planet, is not the dominant object in its orbit, and is not in the plane of the other planets. The only reason Pluto was ever considered to be a planet is because it was first thought to be far more massive, and it was the first **object of its type** discovered. Those who protest this merely found the burden of memorizing the names of nine planets to be onerous enough, and oppose all change. They know little about astronomy, and are entirely unaware that Ceres, the largest asteroid, was also briefly considered to be a planet when it was first discovered, in a very analogous sequence of events. In addition, a larger object, Eris, was discovered more recently, and meets all the criteria that those who insist Pluto is a planet put forth. Unsurprisingly, the oppose any claim of Eris being a planet even if Pluto is, if they have ever even heard of Eris at all. Image from Wikipedia.

c) Humans will not be visiting space en masse at any point in the near future. At the moment, even 58+ years after the first humans in space, the number of people in space at any given time rarely, if ever, **reaches double digits**. Space exploration by Artificial Intelligence is quite literally millions of times more cost-effective, since an AI does not require air, water, or a large living space, and can survive in a far wider band of temperature, pressure, gravity, and radiation than a fragile human. Sending humans into space entirely fails any cost-benefit analysis for any presently envisioned application. We are still very far from a time when there are even 1000 humans in space at once. Instead, we will soon send thousands of AIs housed in smartphone-sized hardware into space in all directions, which will gather thousands of times more scientific knowledge than we currently possess about space.

d) A sphere of 10 light years in radius from the Sun has a volume of 4189 cubic light years. **This sphere contains only about 8 solar masses**, so that the average density of this space is under 0.2% of a solar mass per cubic light year, or barely two Jupiters of mass per cubic light year. The same density exists **if the radius of the sphere is extended to 20 light years** (52-54 solar masses will be the ultimate total once all objects are fully searched). Even this is space that resides well within a galaxy, for intergalactic space is far more sparse than this.

e) The distance between the Sun and the nearest star system is over 26 million times the diameter of the Sun. Nonetheless, the Sun is still easily visible from that distance, indicating how luminous stars are relative to their surface area. Note that the diameter of the Milky Way galaxy is another 22,000 times greater still.

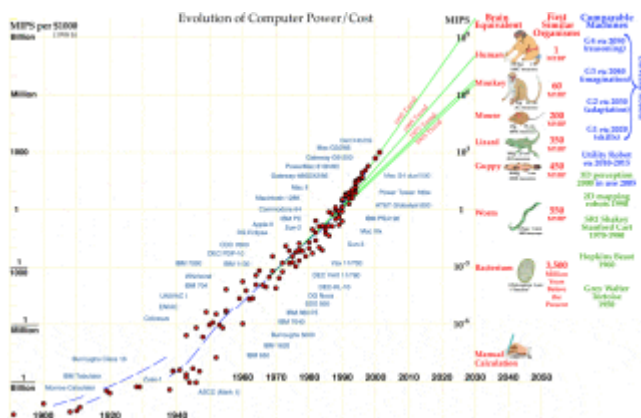
f) Telescopic power is an exponential technology, and rises at a square root of Moore's Law rate, or about 26% a year. This is because if the diameter of a pixel is halved, you need four to occupy the area that was previously occupied by one. Video game graphics improve at the same rate for the same reason. I pointed this out in 2009, and since that time, the number of exoplanets discovered has increased by about 11x, and **the number of Near Earth Objects (NEOs) has also increased at that rate**. Due to this trend, the next decade will reveal many wonders, ranging from another 40,000+ exoplanets to more precise mapping of dangerous NEOs to more **direct images of the surfaces of stars** (another thing that has never been photographed until very recently).



g) Because of the rapid advance in telescopic power, **don't** worry about an asteroid hitting the Earth. It is not the 1990s anymore.

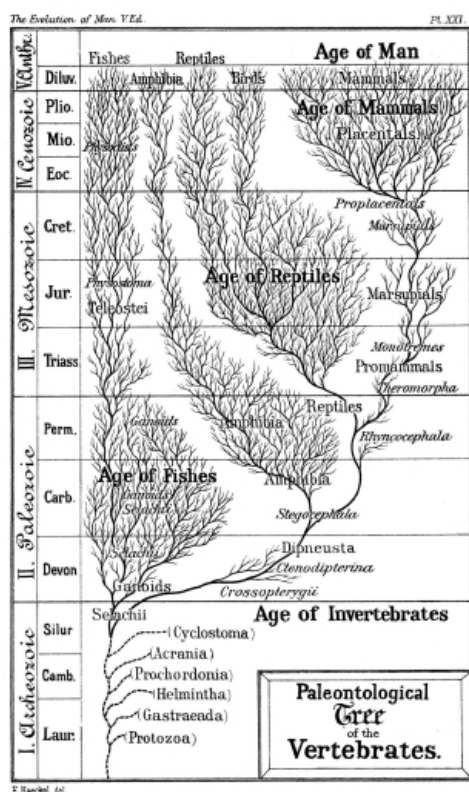
h) Despite the ongoing improvement in telescopic power, my 2009 prediction **that we are unlikely to find any evidence of Extra-Terrestrial Intelligence more advanced than us continues to hold**. The Accelerating Rate of Change makes it far less likely that there are a large number of civilizations more advanced than us (although there could be many less advanced than us). I predict that we will still not have found any evidence 10 years from now either, or even by the 2063 timeframe depicted in the Star Trek franchise. See below for how 'First Contact' may actually happen.

5) Evolution and Biology :



a) The evolution of intelligence displays a distinct exponential trend that has never broken. No matter how large the extinction event, the trendline that measures the intelligence of the most intelligent creature on Earth keeps rising, and has never, ever been broken.

b) The Hans Moravec chart to the right is badly in need of updates, was way too ambitious, and failed to account for software as the bottleneck that core processing power cannot blast through, but nonetheless depicts not just acceleration of biological intelligence, but the convergence of that into computing (again, **my estimate is 2060-65**).



c) The evidence of catastrophic extinction events from eons ago still exists today. The largest extinction event ever was **252 million years ago, before which the dominant life form on land was amphibians**. Over 96% of all species went extinct, and life recovered in a different direction. Hence, there are only three kinds of amphibians today, and most are under 1 kg in weight. Similarly, **the second largest extinction event ever (and the most famous) was 66 million years ago**. Reptiles were dominant before then, but evolution went in the direction of mammals and birds. Reptiles today are only found in four types, and most are relatively small. Reptiles suffered less of a regression than amphibians because the scale of the extinction event that struck when reptiles were dominant was a bit less severe.

d) Evolutionary convergence is an amazing indicator of the deeply embedded 'software code' of life. There were instances where sharks (fish), ichthyosaurs (reptiles), and dolphins all evolved into uncannily similar shapes millions of years apart. On land, ankylosaurs (reptiles) and glyptodonts (mammals) similarly evolved into nearly identical sizes and shapes eons apart. Pterosaurs (reptiles) and bats (mammals) are yet another example. Certain physical forms are optimal for certain means of movement, but that the same shapes appeared millions of years apart in creatures that don't share common ancestors unless one goes extremely far back, is remarkable.

e) As per point a) above, this software has a very obvious exponential recursive mechanism built into it. While recovery from the aforementioned massive extinction events took 10 million and 3 million years respectively, if a similar event were to occur now, it might take a very small amount of time for a rebound to complete itself.

f) Brains are expensive. Human intelligence is due to a brain that consumes a large portion of human nutrients and energy, and thus comes at the cost of having thin skin, small and weak teeth and nails, and low physical strength. A human would fare very poorly in a fight with an animal of similar size (such as a leopard, wild boar, small alligator, or small bear). Even a smaller animal such as a chimpanzee or grey wolf can easily defeat an adult human male. We have survived only because intelligence gave us teamwork and the ability to make increasingly more effective weapons. This is also why all intermediate stages of proto-human between the intelligence levels of humans and chimpanzees died out long ago; they were outcompeted from both above and below.

g) Evolution is ongoing and accelerating. I consider new technologies that speed up educational outcomes and cognitive capacity to be part of the natural trendline of accelerating intelligence.

h) As stated above in 4(c), we may never have a large number of humans living in space. As AI is far more suited

for space than humans are, perhaps the endgame of evolution on Earth is for AI to spread outwards into space. Perhaps contact between extraterrestrial intelligence only happens between two AIs that encounter each other, and then communicate at the base Assembly Language (or Quantum Qu-bit) level.

6) Historical Observations :

a) Laws, once passed, are extremely sticky. It may surprise you to learn that France still executed convicts on death row via guillotine as recently as 1977, and the law existed all the way until 1981. Similarly, 'anti-miscegenation' laws existed in Alabama until 2000.

b) It takes time for a technology to mature (even if this process continues to accelerate in the modern era). Vikings reached North America by 1000 AD, but their colonies failed, and they even abandoned their Greenland colony that existed for 500 years. By the 16th century, the powers of Western Europe had the colonization template down, and were able to take over most of the two continents in the Western Hemisphere. For the British Empire, this was so refined and efficient by the late 18th century that despite having started very late in Australia, they were at a point of such turnkey implementation that they could create a fully functional colony in a very short time.

c) The British Empire was the greatest demonstration of a late-mover advantage of all time. Iberians landed in the Americas and in India long before the British, but their empires declined when the British were ascendant. Hence, the British were the ones to ultimately take control of land that eventually became the United States and Canada, and became the ones to colonize India. Furthermore, the Chinese, Spanish, and Dutch all could have (or in some cases, did) land in Australia centuries before James Cook in 1795, but as the British Empire had the science of colonization down to a turnkey level by that point, while also controlling resource-rich (at the time) India, they were the ones to become the dominant culture of that continent (New Zealand was always going to be colonized by whoever controlled Australia first).

d) Every atrocity imaginable has happened in Europe within the last 100 years. Despite the high degree of civilization today, everything from genocide to **state-conducted beheadings** to **chemical weapons usage** to **widespread cannibalism** has happened in Europe in the last century. This fact can be interpreted in glass-half-full and glass-half-empty ways.



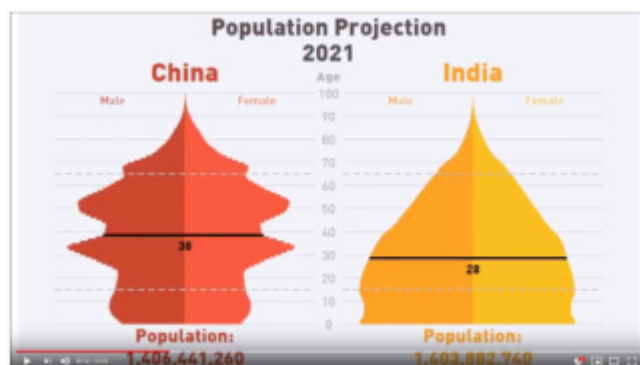
e) Few realize how quickly **the economic center of gravity** is converging back to the East.

f) When Europeans first landed in the Americas, the natives had not invented the wheel, metallurgy, boats that were capable of ocean voyages, or the domestication of any riding or draft animal. They were thousands of years behind Eurasia.

g) The Queen of the United Kingdom has been an exemplary monarch for 68 years. Because of the unusually long duration of her reign and her sterling conduct, people have forgotten that there is a debate beneath the surface about the continuation of the monarchy itself. When the Queen passes, calls for an end to the monarchy will resurface immediately. The monarchy will not end since it generates too much tourism revenue, but it may shrink. It is excessive for adults further down than third in line to get to live in opulence at taxpayer expense, as anyone

further down than that has absolutely no chance of ever ascending to the throne in the modern age. Expect the list of opulence privilege to be shortened considerably when succession occurs.

7) India :



a) India is about to surpass China as the most populous country in the world (India already has vastly more young people than China). When the mainstream media notices this, the resultant media coverage will create a number of secondary effects. India is woefully underprepared for the spotlight.

b) If you are interested in visiting India, there is a tremendous amount to see (among the highest of any country), but I still do not recommend that anyone visit India as a tourist before 2025. There are too many aspects of the experience that lack the benefit of basic modernization as of now, but may be substantially improved by 2025, as India is in the process of skipping an entire generation of technology. Also, as with any trip to an unfamiliar location, be sure to watch a few recent travel vlogs first.

c) A tremendous amount of valuable science, philosophy, and art has been produced by India. But almost all of it was over 300 years ago. Recent contributions are scant.

d) A variety of 'experts' keep saying India will break up into smaller pieces, but this has not happened since 1947, even as the Soviet Union, Yugoslavia, and Czechoslovakia did in fact break up instead. On the contrary, India has achieved what the EU has completely failed to - create a giant nation by unifying a variety of smaller linguistic and cultural regions. In fact, India has thrice the population of what even a united EU would have, and has to deal with poverty that the EU does not have.

e) **Much has been written about how the British Empire strip-minded India of every valuable resource**, while others write about how British institutions benefited India. I have evaluated both sides in detail, and have concluded that British colonization of the Indian Subcontinent was a wash to a slight negative, but certainly not a huge determinant of India's long-term trajectory. What is for certain is that the poverty India still has in 2020 is certainly not the fault of the British who departed in 1947. Indians need to get over that. Note that India's diaspora, which resides almost entirely in **countries that were parts of the British Empire at various times** (making it easier for Indians to succeed there), **remits \$90B/year back to India as we speak** (with another \$35B/year remitted to Pakistan + Bangladesh, which were also part of British India until 1947). While these remittances didn't become significant until 2000, it nonetheless comprises of something that is directly connected to the footprint of the erstwhile British Empire.

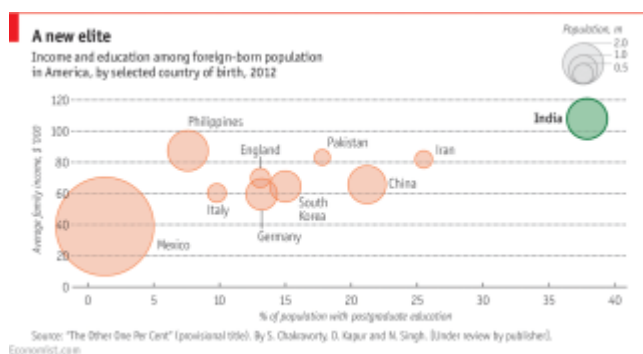
f) There is a certain pervasive and inescapable toxicity (biological, chemical, and psychological) that exists in India, which leads to even wealthy people born there to end up much shorter, physically weaker, and less attractive than a person of the same genetics would be in a better environment (see 'Indian Americans' below). This pattern is pervasive, and, again, affects wealthy people all the same. As evidence, observe how poorly India does at the Olympics, vs. the fact that Indians born in the West have a much higher proportion of top-tier athletes in their ranks. More subjectively, the average Western-born Indian woman would place at about the 85th percentile of looks among young women from prosperous backgrounds of the same age in India. There is little awareness of

this, and even wealthy Indians have too little exposure to the outside world to even notice (or otherwise choose to nurture a denial). But this comprises a massive and preventable wastage of human capital.

g) India has the second highest amount of arable land in the world, and the highest in the Eastern hemisphere. Yet, it is not a net food exporter, a status that would not only boost its economy, but make it entirely secure from any military aggression. Lest one say that India has too many people to be a food exporter, **The Netherlands has the same population density as India, and a much colder climate, yet is a huge food exporter.** This lack of vision (among many others) will continue to keep India in a state of relative destitution for some time to come.

h) Despite moderate economic progress, **India still ranks in the 120-129 range out of the 185+ countries in the world** in terms of any prosperity metric, which is the same approximate ranking it had 30 years ago. Alas, it is not going to break into a ranking better than 110, let alone 105, in the foreseeable future, contrary to what many Indians have self-deluded themselves into thinking. India is a growing economy in absolute terms, but in relative terms, not so much. Economically, it is not in China's league by any stretch, despite the fact that China's per capita GDP did not surpass India's until 1993.

8) Indian Americans :



a) **Indian Americans are the most successful nation-categorized ethnic group in the US by household income, bar none.** This is atypical, as it is commonplace for immigrants from poor countries to underperform in the United States as well. There is no other example where the diaspora in the US has anywhere near as large a gap with the prosperity of the original country. As this fact is not yet widely known, when it becomes such, many things about US and international geopolitics will adjust in surprising directions.

b) It is often claimed that the Indians in the US are the 'cognitive elite' of India, but that is not quite true. Why would that be more true of India than of China, or Russia, or Brazil, or Pakistan? In my experience, the Indians in the US come from the Top 20% of India, ranked by intelligence, but not weighted towards the Top 1% by any stretch, as is sometimes claimed by those who want to minimize Indian-American success. Many of the wealthiest Indians in the US are owners of hotel and gas station networks, rather than elite white collar professionals with advanced degrees.

c) Note that Indians are not recipients of affirmative action in the US, contrary to default perception, since they are an Asian ethnicity. In fact, Asians (Indians included) are increasingly discriminated against in areas like admissions to elite universities, for fear that these Asians might become the majority of entrants. Indian-Americans would be 20% of incoming freshmen at the top universities, despite being just 1% of the population, if there were no affirmative action.

d) **Despite this success**, foreign-born Indian Americans have a relatively low assimilation index in the United States, at least in terms of measures outside of economic success. They are quick to limit their socializing to not just other Indians, but others from the same sub-ethnicity if enough of those people are to be found in their town. For this reason, the generation gap between US-born children of Indian immigrants and their parents is among the highest of any ethnic group. Of course, the assimilation rate of the US-born 2nd generation is the only one that matters, as

the foreign-born parents eventually fade out.

e) Complicating the identity crisis of Indian Americans is the fact that in the United States, the words 'Indian', 'Caucasian', and 'Asian' are all used inaccurately. Native Americans are called 'Indians' because Columbus thought he in fact landed in India, which is where he wanted to reach in the first place, **since it was the world's largest economy at the time**. It is amazing that the most economically successful ethnic group still resides in a blind spot of categorization that the other 99% possess.

f) I am disgusted to see some Indian-Americans trying to cash in by packaging themselves as 'anti-white' propagandists. This is extremely unwise and entirely without justification, since white Americans and Canadians are the least racist white people on Earth; Indians wouldn't be so successful here if most whites were racist towards Indians. Plus, Indians partaking in this are appropriating the real historical oppression of African Americans and Native Americans by doing so. It is far better to be seen as a 'model minority' than a 'hostile elite' (the only two choices available given the low assimilation rate of Indians), particularly when one can point out, with full justification, that these individuals are free to leave and go to India rather than complain over here. They are also abusing the fact **that to Americans, India is the second most favorably perceived non-Western country and most favorably perceived country in the world among those without an advanced economy**. Furthermore, the aforementioned types of Indians tend to get onto trends that are already peaking and in decline, and are a reliable indicator of such.

g) **Ian Grillot is an all-American hero who risked his life to save Indian immigrants amidst a murderous hate crime**. Fortunately, Indian-Americans honored him and raised a \$100,000 reward for him, and I want to make sure he is recognized for years to come beyond just the Indian community. For Indian-Americans reading this, the next Ian Grillot might save your life, while an Indian who writes anti-white articles is, conversely, fostering a sentiment that endangers both your physical and financial well-being.

9) Interpersonal Interaction :

a) Vastly inaccurate accusations are almost always projection on the part of the accuser. They dislike certain aspects of themselves, and have to channel this outward rather than undertake the more difficult task of self-examination. The appropriate response is not to defend yourself, but immediately counterattack by pointing out the projection.

b) Sadly, whenever there is an altercation, most people don't care who 'started it'. If someone attacks you and you defend yourself, most people will say that both parties are at fault. This goes back to ancient human instinct from pre-historic times, where the 'winner is always retroactively in the right'.

c) People who debate via anecdote rather than through data-driven facts tend to not be very successful in life, as they will often miscalculate probabilities and make poor decisions.

d) Avoid dealing with people who use the word 'asshole' with significant frequency, even if the people they describe are deserving of scorn. Such people tend to have poor character and counterproductive habits. Ironically, the same is not necessarily true of people who partake in moderate use of the word 'fuck'.

e) Children of wealthy families have more confidence, as a byproduct of their privileged upbringing. This often is interpreted as proof of competence. Be wary of assuming that such competence exists, because it usually does not.

f) Anyone who yells at people in a weaker power position (i.e. when the yeller faces no real risk), with little provocation or over trivial matters, is someone who is not merely a coward, but someone who never achieves anything of significance. Avoid such people in all business and social matters. If your parents treat you this way, and if you are old enough, take steps to keep all contact to a bare minimum. You have no obligation to receive abuse when your time can be spent elsewhere. Put a higher price on yourself and your time.

- g) Similarly, be very skeptical of people who go on gratuitous power trips. Most of the time, this is a subconscious attempt to distract away from how little substance is actually behind their act, and the insecurity they languish in as a result. This is common among people who hail from high-profile families, but themselves have little to no talent or brainpower.
- h) Avoid people who are committed to misunderstanding you (negatively). Any energy spent on them will be a waste. Cut your losses quickly and quietly, and interact elsewhere.
- i) The two most powerful words in the English language are "Make me". If someone demands that you do something, this will give them an ultimatum to either escalate immediately, or they will never be in a position to irritate you again. Despite the chance of short-term conflict, using these two words intelligently can save you a lot of time and expense.
- j) The sons of exceptionally wealthy and famous fathers tend to have very easy lives as long as the father is alive (assume this to be age 50-55 on average for the son). This is because people proactively do favors for the son just to earn the goodwill of the father. Note that this is a force the father has no power to obstruct, no matter how much he taught his son to be humble. After the father passes, people who were proactively doing favors for the sons suddenly discontinue such favors, and the son is left to flounder as this is the first time in his life, at age 50, that he has to experience the world of everyone else; a world that is no longer so easy. The son will not be able to pinpoint what exactly changed, and often cannot adjust to this status demotion at this late of an age. Steer clear of these implosions, as they are not pretty and there is collateral damage (e.g. an entire inherited business might get run into the ground, with all employees laid off). Only sons with similar talent levels as the father (very rare) are exempt from this. Think about examples of this sequence of events you may have observed, and take steps to avoid any proximity to the next one. This does not apply to daughters with the same precision.
- k) Limit any professional interaction with people who dress below the standard than is appropriate for a setting, or otherwise put insufficient effort into their personal appearance (unless they have already received major accolades for exceptional research or innovation). This is indicative of unsuitability for a professional collaboration, even if the person is a pleasant person in general. There are plenty of fools that are quick to point out that 'XXXX tech billionaire dresses poorly'. Usage of such an example indicates that a confusion between the concepts of 'because of' and 'in spite of'. Sartorial excellence is still valuable in this world.
- l) The best people to associate with are those who :
- i) Don't treat those who are (or are perceived to be) lower-status people badly just because they can do so without accountability.
 - ii) Possess a wide range of knowledge about seemingly disparate subjects, and have mastered skills or subject areas you wish to excel in.
 - iii) Are continuously working on several aspects of self-improvement, and seem to be getting results.

10) Slice of Life :

- a) **To help society the most, do what you do best.**
- b) A fire hydrant might be used for a three-hour period every 50 years, or less than 0.001% of the time, on average. For this reason, it is illogical for there to be a rule that cars cannot park in front of it, particularly when this reduces the available parking in an urban setting by several percent. Fire hydrants in urban areas should be retrofitted with a rigid plastic or metal yellow or red flag that is 6-7 feet high, so that when that one day arrives, it is visible even if a car is parked in front of it. The parking situation in many cities can be eased somewhat immediately, and the city can get more parking meter revenue that will swiftly pay back the retrofitting cost.
- c) Americans spent \$80 Billion in real estate commission fees in 2019. Despite the presence of companies like

Redfin, it is amazing that this has not been technologically disrupted through a LegalZoom-type service, or through more advanced smart contracts on distributed ledgers, rather than an unjustified percentage fee. Particularly for homes above \$1 million in value, it is certain that the buyer and seller have common professional contacts on LinkedIn. There should be a service where common contacts vouch for the transaction, observe the signing, register notarization in a smart contract, and collect at \$1000 fee for their two hours of trouble. This could greatly lower the transaction costs, which in turn will enable more transactions. If LinkedIn or another company pursues this idea, I expect a small royalty fee.

d) Why do cars have only one type of horn sound, instead of two? There is a big difference between a desire to communicate a polite *"if you could move, that would be splendid"* vs. a *"MOVE, YOU ^&^%\$(X%!!!"*, so automobile horns should at least have two choices of sound in order to differentiate between the tone intended by the horn honker. A lot of road rage incidents could be avoided. If cars adopt this idea, I expect a small royalty fee or lump sum payout.

e) Why is a 'good' hotel merely the most expensive one? If anything, the value per dollar declines as the price of a hotel rises. It is unfortunate that being more expensive is equated with being 'good', when the true metric ought to be value per money. This misconception plagues many consumer goods.

f) The United States is still forming. The **mean center of population** has drifted over 1000 miles westward, and now resides in Missouri. The fact that the Federal Government is so far from what is now the mean center of population is the source of many problems, including many seemingly unrelated ones. We should consider, at the 250th anniversary of our founding in 2026, moving the Federal Government to somewhere near Southern Missouri, with the understanding that it could move again in 50 years time if the population center drifts too far away from there.

g) The United States is still forming. Interracial reproduction was taboo even in the 1980s, with almost none of the most popular television programs of the time depicting any significant interracial romantic relationship except when that itself is central to the plot. Over 30% of second-generation Hispanic and Asian Americans intermarry (mostly with whites), and 20% of babies born in the US are mixed-race (not counting the fact that most Hispanics are already mixed-race), and that number is rising quickly.

Now, without further ado, I step aside and make way for the man that most of you came here for. I do not endorse any of his political content or views. The fact remains, he can somehow manage to get more traffic for a single article than many bloggers get from a hundred articles. The legend returns...



By Imran Khan :

Today is 1/1/2020. I have **long since stopped blogging**, and am coming out of retirement for just this one article, because I committed to it 10 years ago when I wrote one of the most famous Internet articles of all time (mentioned in the New York Times a few times), and thousands of readers are expecting the sequel. I was quite moved by the number of men who **said the article changed their life for the better**, or were **brought to tears by it** (which is extraordinary for a written article). **Many women are fans of it too**, as they recognize that I am trying to help everyday women as well, since they are equally the victims of those who oppose gender realism. The article itself has outlasted almost all of the links in it.

While I was born in America, I have expatriated out of the United States to live in one of the Middle Eastern

countries that is popular among expats, and where the state and society still wants family men. Unlike most of the Western 'red-pill' movement, most of my knowledge about the truths of gender realism is from my Islamic faith, and has been common knowledge to many Muslims for centuries (and is readily present in the Christian Bible too). I just am someone who can translate these scriptural concepts into words that an American/British/Canadian audience can grok instantly. I am not the same Imran Khan who is the 67-year-old current Prime Minister of Pakistan.

11) The Misandry Bubble :

"Women, Children, and Pets are loved unconditionally, a man is only loved under the condition that he produce something" - Chris Rock

a) **The Misandry Bubble**, as predicted in the article itself on 1/1/2010, became the manifesto of the anti-misandry movement, and thus an influential defense of human nature itself. It has been read by over 1 million people to date, and the Reddit(s) that cite this article as such have over 300,000 members. Due to this, we are definitely past peak misandry as of now. While most of the blogs linked in the original essay have been deleted or even deplatformed, the readers and contributors have diffused and burrowed deeper into the Internet, **making the truths exposed more widely known than they otherwise might have been.**

b) As predicted exactly 10 years ago :

i) There is still no organized Men's Rights movement, in terms of protests, lawsuits, petitions, etc. In fact, there are individuals who pretend to be Men's Rights Activists just to get donations from mistreated men desperate to fight back, but who have no intention of doing any activism. Any activism that actually damages the misandric apparatus is quickly reversed. Don't give them any of your money or any other form of endorsement.

ii) 'Sexbots' are still no closer to reality than they were in 2010, **but VR Sex is all but here.** As explained a decade before, this benefits even men who don't use it, as it corrects the imbalance in the marketplace. Yet, there are still technological ignoramuses who fixate on the prospect of 'bots' that will not arrive in the near future because there are too many product design obstacles. **This includes the campaigns by (very unattractive) women to ban these 'imminent' sexbots,** and thus are oblivious to the far more imminent technological and social disruption of VR substitution. The rise of aggressive new STDs, with women as carriers, are an additional force advancing VR Sex.

iii) The Four Horsemen of Male Emancipation have all advanced, but the fourth advanced the most. Observe how huge of a move there has been by men **to avoid marriage** (both consciously and subconsciously), and how apps like Tinder have served to organize all women for efficient 'on demand' usage by the top 20% of men, ensuring that these women are made permanently unsuitable for marriage on account of having had 20, 50, or 100 prior sexual partners.



iv) In the US, the departure of young men from marriage is causing **a predictable panic among women and 'social conservatives'**, who just cannot tolerate men acting in accordance with their own self-preservation. Demands for more government coercion will be next, and expect the most oppressive ideas to originate from 'social conservative' Republicans, rather than radical 'feminists'.

v) The grassroots backlash against corporate misandry is now powerful, swift, and international. Gillette's ill-conceived decision to vilify its core customer just so that a few mid-level agitators could outdo each other's displays of misandric flamboyance **caused an \$8 billion loss for the company.** The 'Get Woke, Go Broke' phenomenon continues to manifest.

vi) Similarly, extreme 'feminist' displays of narcissism peaked with the 'ShirtGate' episode, where **a major event in human scientific progress was hijacked by some of the most petty, anti-civilization 'feminists' ever** (with creepy 'male feminists' piling on). The episode continues to be referenced as the epitome of 'feminist' ugliness and anti-enlightenment as few incidents encapsulate *everything* wrong with 'feminism' so completely. The army of people who rushed to the defense of the abused scientist, on what should have been the greatest ever day of his career, was heartening. Revealingly, nothing quite so absurd in terms of 'feminist' abuse of a non-political person has happened since, as this really was the straw that broke the camel's back. If you want to pinpoint an exact incident and week where the Misandry Bubble peaked, **November 14-21, 2014** was it.

vii) GamerGate was a similar cultural tremor, also in late 2014. It comprised of men who were minding their own business opting to fight back against excessive 'feminist' demands that they stop their recreation to spend more time producing resources for ungrateful 'feminists' to parasitically consume. The gamers found that 'feminists' are so unaccustomed to being challenged that they could only respond by demanding that other men defend them. Few men volunteered for this thankless task other than some 'male feminists' and cuckservatives (see Section 19 below), and now 'feminists' are too hesitant to harass gamers further. This, too, is a major victory, and a template of what works against misandry.

viii) There was a secondary 'last gasp' peak of the Misandry Bubble on **May 9, 2016**, about 18 months after the primary peak described above. **There was a video posted on the PragerU channel by someone named W. Bradford Wilcox**, which claims that men can only become 'real men' if they make unreciprocated sacrifices for women under legally binding government contractual documentation. PragerU/Wilcox has never made any equivalent video demanding that women make sacrifices to meet their obligations to society, and they never will. This incredibly and cartoonishly dishonest video **proves that 'conservatives' want socialism just as badly as leftists**, except that they specifically want a 'chivalrous' socialism that bears no resemblance to traditional marriage, where only men are forced to be net payers, and women are net recipients. The overwhelming downvote ratio and negative comments on this video was among the greatest 'Streisand Effects' of all time, since it provoked a number of anti-misandry advocates to **publish rebuttals**, which got so many views, **even years later**, that many men who were not even seeking to become redpilled, learned the truth by exposure to the rebuttals. Mr. Wilcox is thus now widely and deservedly known as 'Wilcucks', is considered the very personification of cuckservative misandry, and if you doubt that physiognomy is real, **look at his face**. To this day, Wilcucks has a cushy University sinecure where he is paid to misrepresent the cost/benefit analysis of marriage to men to further **the cuckservative vision of slavery-centric socialism**, so if you want to give him a piece of your mind, find him on Twitter at **@WilcoxNMP**. Provoking him will further strengthen the Streisand Effect that he continues to generate, and is thus the highest bang-for-the-buck activism you can do. See 'US Conservatism' below.



ix) The fact that 'Male Feminists' are often creepy predators in disguise has become widely known and many such individuals have fortunately been exposed and convicted. Glenn Reynolds of Instapundit keeps a running chronicle of the numerous instances where the true nature of such an individual is exposed, and women have written articles warning other women to avoid these sexual predators. The #MeToo movement excised quite a few of these predators, but many still remain. Expose these 'male feminists' proactively and ruthlessly, since they are hated by women too, and thus are not a protected group.

x) 'Feminists' like Hanna Rosin have gloated that 'men are obsolete', and display an exceptionally poor understanding of what the real market forces are as they attempt to make their case. Such intellectual dust mites seem to not realize that about 90% of the world's people don't live in Western Protestant countries. These individuals have gone quiet of late.

xi) Melinda Gates' videos about the 'pay gap' and 'women in tech' have just about the worst ratio of upvotes to downvotes in YouTube history. This indicates that the silent army of informed men is orders of magnitude larger than it was a decade ago.

xii) By contrast, parody accounts that portray 'feminists' with great accuracy have over 400,000 followers.

xiii) Powerful documentary films, including those made by courageous women, have been produced and viewed by a large number of men, and more men are adapting to avoid risks. Other documentaries have exposed the \$50 billion divorce industry for what it is.

xiv) The distinction between Marriage 1.0 and Marriage 2.0 has been mainstreamed. This is putting an end to the cuckservative scam that claims following Biblical marriage involves signing a government document, removing all fathers' rights, and eventually replacing the father with forced, USSR-style wealth transfer.

xv) Even Wikipedia, an organization notorious for remaining in denial about why almost all contributions to Wikipedia are and always will be by men, allows mention of the fact that the human brain is hardwired to treat women more favorably than men to reside on Wikipedia.

xvi) The Tea Party swiftly and predictably failed, since blue-pill cuckservatives were giddy about women getting involved. But once in, women disallowed any talk of cutting government spending that goes to women (which, of course, is most government spending). Expecting women to fight for small government is like expecting government employees to fight for small government.

c) Other Misandric Facts :

For Every 100 Girls/Women.....	There are this many Boys/Men....
Who take AP/Honors courses in Art/Music	54
Who earn an associate's degree	63
Who take AP/Honors courses in Foreign/Classical Languages	64
Who take AP/Honors courses in English/Language Arts	64
Enrolled in US graduate schools	73
25 to 29 years who have at least a master's degree	73
Who earn a bachelor's degree	74
Who earn a master's degree	74
Enrolled in US colleges	77
Who are in the top 10% of their high school class	79
Who take AP/Honors courses in Natural Sciences	79
25 to 29 years who have at least an associate's degree	80
25 to 29 years who have a first professional or doctor's degree	81
Who take AP/Honors courses in math	82
25 to 29 years who have at least a bachelor's degree	85
Who take the SAT test	89
Who earn a doctor's degree	90
25 to 29 years who have at least some college but no degree	94
Whose entry into kindergarten is delayed	139
K-12 in public schools classified as having mental retardation	140
Who repeat kindergarten	145
Who are homeless	154
Ages 3-17 years diagnosed with communication disorders	168
Who abuse illicit drugs and alcohol	180
Who have problems with alcoholism	200
In K-12 and classified as having a specific learning disability	207
Who die by opioid overdose	212
25 to 34 years old who die	232
4-17 years diagnosed with ADHD	237
Suspended from school	240
Who are homeless and unsheltered	242
15 to 24 years who die	280
Expelled from school	291
Ages 15 to 19 who commit suicide	293
Who receive services in public schools for autism	300
In public schools classified as having emotional disturbance	315
Ages 20 to 29 who commit suicide	450
Ages 20-29 who die of homicide	648
Under age 18 who are in a correctional facility	770
In adult correctional facilities	1,000
Who die on the job	1,294
In a federal prison	1,333

i) In World War 2, of the 300,000 Americans who died, 16 were women, so about 20,000 men died for every woman who died. In the VietNam War, of the 58,000 Americans who died, 8 were women, so about 7,500 to 1. This was in a time before 'feminism' and a time when many soldiers were drafted, when the narrative insists that women had far worse lives than men. The Female Imperative (FI), also known as Gynocentrism, transcends all centuries and all cultures, as it is biologically hardwired.

ii) In the Protestant West, **men are overwhelmingly net tax payers, while women are overwhelmingly net recipients of government spending**. These countries have decided to exempt a large portion of the female population from contributing anything of value to society. Expect the flow of international emigration/immigration to reflect this incentive structure, stressing it in both directions, as this becomes more widely known.

iii) Men continue to be sentenced far longer for the same crimes (**which even the Huffington Post admits**).

iv) **This table from Prof. Mark J. Perry pretty much lists all of the statistical facts about how men have it worse than women (click to enlarge)**. 'Feminists' won't understand the table since innumeracy is a pre-requisite of 'feminism'.

v) The fact that almost all transgender people are male to female rather than the other way around is another indicator of which gender is treated far better by society, and which direction the government mandated wealth transfers flow in. They are merely responding to incentives.

vi) The victims of the **Isla Vista shooting** amounted to 4 men and 2 women. Yet, the shooting is described as 'misogynist'. **The shooter was a staunch 'male feminist' for many years**, who actually hated pickup artists since they were succeeding where he was not.

vii) **26 of the 27 deadliest mass shooters were fatherless**. Again, remember that 'feminists' and conservatives are both responsible for this situation, as most of the laws that subsidize single motherhood are the inventions of conservatives from the reddest of red states.

viii) **There is a growing trend of 'feminists' murdering their young sons**, which other 'feminists' **approve of as a form of 'post-birth abortion'**. The justice system is quite lenient on such women, indicating the cultural momentum in favor of this trend, which portends to the future horror of 'feminists' unilaterally deciding to murder other people's little boys, and facing minimal consequences from the judicial system.

ix) **Some boys are beaten to death by their mothers for refusing to dress like a girl** (as decided by the mother).

x) Some 'feminists' **openly advocate for killing all men, face no penalties for saying that under their real names**, and have no curiosity about how the inventions that built modern society even emerged. While this will obviously never gain any traction (who will do the killing?), it is yet another indicator of a mind free of any accountability, as well as how utterly uneducated 'feminists' are no matter what credential they possess. Note the implicit assumption that civilization just 'happens', which has common elements with the 'women in tech' extortion racket explained below.

xi) **It is standard media protocol to never mention the father of a child in any news story in which a child features**, unless the father can be portrayed negatively. This is hard to notice, but keep an eye out for this absence of mention.

xii) In many cases, shaming language is all they have. Refer to **the catalog of anti-male shaming language, which has useful responses for each**.

d) Radical 'Feminists' :



i) Radical 'feminists' are wired to protest an advanced society at every imaginable level. If you doubt this, read the links archived **here** and **here**. If, part way through, you are too disgusted to continue, that proves my point.

ii) In my youth, I was puzzled as to why all societies Western and Eastern once had a practice of identifying certain women as 'witches' and exiling them from society. Contemporary radical 'feminism' explains why this mechanism existed as a societal immune response.

iii) The scarcest valuable in the entire world is female beauty (as measured by how much money and attention the scarce examples of this attracts). Nonetheless, 'feminism' **has induced many formerly attractive young women to deliberately and irrevocably destroy their appearance**, and with it, the prospect of living a life where they could have wanted for nothing had they followed a basic life script that their grandmothers would have considered to be normal.

iv) **'Feminists' are often extremely racist**. They usually get a free pass on this due to the extreme feminism-favoring structural biases across our society. But their racism is always just under the surface, and bursts forth **when any person of color fails to obediently agree with any and all aspects of feminism**.

v) **As Glenn Reynolds often says**, you could make a rock-solid case for Patriarchy just based on what 'feminists' insist about the fragility of women.

e) Predictions :

i) While neither gender will ever be technologically obsolete as human beings, and it is quite evil to even hope for such a thing, the fact remains that to the extent that technological progress will reduce the power of one gender relative to the other from the current state, women have far more to worry about than men. This will be particularly true for Western women who work in types of jobs that don't seem to exist in great numbers outside the Protestant West (i.e. make-work jobs), and who think that becoming a wife and mother is less prestigious than a corporate career.

ii) **The Nigerian romance scam will continue to prey on divorced women who secured a huge financial windfall**, in a brutal manifestation of how market forces find a way around government social engineering. Another benefit of marriage is that it is far harder to scam a couple than an individual. Story after story of how women were scammed out of all of the money in their control, which is often a six or seven digit sum, continues to emerge. So now, because of the woman's selfishness (if her money was obtained through divorce), neither the husband nor her are in possession of their money.

iii) Comedians who used to **make fun of misandry**, including **more than one type of misandry**, have recently been threatened into silence. But evidence is emerging that comedians will fight back with vengeance, sending thousands of 'feminists' into futile therapy (since 'feminists' can't fight back via comedy due to zero talent in that area). Bill Burr's **old anti-misandry bits** are quite good, as are those of **Aries Spears**. The late, great **Patrice O'Neal** should be remembered for his courage.

iv) There will never be any 'feminist'-themed reality TV shows that garner significant audience viewership. The very premise itself is an oxymoron of 'fried ice' proportions.

v) VR just has to fix the nausea/eyestrain problem, and make the hardware lighter and wireless. These seemingly mundane refinements are all it will take for millions more women, higher up in the looks scale, to suddenly get far less male attention for reasons they can't discern. As said above, this could be within 24 months.

vi) While **franchise after franchise of entertainment property has been ruined by a 'feminist' edition that explicitly seeks to overturn the central premises of the franchise**, they have not been able to destroy one of the oldest and most successful ones : James Bond. Over 58 years and 25 films (including a non-Eon film), the age gap between the actor playing Bond and the female lead averages about 17 years, with a 47-year-old Bond and a 30-year-old actress as averages. 'Feminists' will continue to move mountains in a campaign to destroy this or even demand that Bond be played by a woman, but will fail. This franchise matters due its highly international fan base, and thus sells tickets in countries where 'feminism' is not the official ideology.

vii) Governments that used 'feminism' to create a welfare-state voting block will start to quietly and methodically trim down the resources diverted to women. They can get the same women to keep voting for the same parties even after they reduce the money diverted to them, now that they have them in a state of complete indoctrination and dependency, and since these women are not producing any new taxpayers/voters. Why overpay for a vote block that can no longer leave even if you cut them off?

viii) Outsourcing of jobs will continue to affect women more than men, **since the indirect costs associated with hiring women in the West are pricing women out**. Remember that base salary is only a fraction of the cost-of-doing-business equation. I am currently making big money in facilitating the outsourcing of service jobs from US and UK women to English-speaking Filipino, Malay, and Pakistani men and women in the Persian Gulf country that I operate in, where I pocket part of the difference. A large part of the difference is the 'litigation premium' associated with hiring women in the US, UK, Canada, etc.

ix) As US cuckservatism experiences its final death throes over the course of the 2020s, 'feminism' will continue to weaken as well, with few understanding why the correlation between the two is so tight.

f) But did the bubble fully pop, even if we are past peak misandry? Unfortunately, not fully. The reason for this is that 10 years ago, it was inconceivable that we would not have another recession within the next 10 years, as the next recession will surely destroy many types of 'feminism'. The money-printing from the Federal Reserve allowed government spending to continue past a point far greater than old models could have predicted (no one thought the US could get to \$23 Trillion in a National Debt without a crisis). My co-blogger above favors this money-printing and wrote a whole book about why, but I dislike it, since it enables far more government spending, which of course goes mostly towards women, particularly women using the money to create 'feminist' outcomes for themselves that could not exist without government spending. So a recession is the necessary trigger for a full pop. That does not mean we wish for a recession, as that will harm innocent people, but there is no doubt that in each recession, the

most undeserved net recipients always bear the force of the correction that a recession brings. The question is, how long can printing stave one off?

g) Here is some [eye cleanser](#) (more [here](#)) that you may want to refer to as you keep reading.

12) Female Psychology and Aptitude :

a) The female brain does not connect cause and effect as easily as the male brain does. Women cannot easily predict the effect of a decision more than one step ahead. For example, a woman's legal, state-backed ability to unilaterally take away children from their father means that the paternal grandmother also loses access to her grandchildren due to the power that the former daughter-in-law has. Yet, there is no organization, however small, of paternal grandmothers protesting against default daughter-in-law custody. The cause and effect dots are just not connected in the female mind, and so they cannot see how a law that 'helps women' simultaneously can harm a different group of female relatives. If you doubt this, try explaining this to women, and see for yourself how difficult it is for them to connect cause and effect.

b) Women are not immoral. They are simply hardwired to side with whoever is winning, as this evolutionary trait helped women survive in times of conflict, and thus evolved for good reason. Keep this in mind in order to be on the right side of this unstoppable force, rather than on the wrong side. Don't argue against this, just adapt to it while other men remain clueless and bear the costs.

c) [In every single country polled, women knew far less about civics or political science than men.](#) The gap was higher in countries that squandered the most resources towards 'feminism'.

d) If you ever hear that something would improve if women ran it, there is a prominent example of where this experiment has been conducted. The US public school system has transitioned from male leadership to female leadership over the last 30-40 years. Over this time, quality has fallen as costs have risen. This period [has also seen the rise of rampant sexual exploitation of minor students by female teachers.](#) Similarly, [the rise of women in top positions in higher education has coincided with the steep decline of the cost/benefit equation of college degrees.](#)

e) Virtually all works of fiction marketed to a female audience consist of an alpha male with a harem of women (of which the reader erotically fantasizes of being part), and the alpha male abusing lower-ranking males and the women in his harem. There is no improvement in the human condition or any wondrous new concepts. This is the type of society women prefer, for biologically-derived reasons. A free-market system where a self-made man can rise to the top is emphatically not what women prefer, as it is hard to predict which man as 'lottery ticket' will outperform others. An oligarchal/aristocratic system is one where the men on top today will still be on top 10 years later, making it far easier for women to select who to get impregnated by. Of course, societies of the type that women prefer are not where anything new gets invented, so human progress stalls (see 'Fabric of Humanity' below).

f) [84% of women cannot pass the US Army's basic fitness test \(while only 36% of men cannot pass it, despite the spreading 'soyboy' malaise\).](#) Of course, the conclusion drawn by the 'male feminist' journalist is that the test has to be changed. It is certain that if female combat deaths began to approach anything close to 50%, the same 'journalists' would complain about how misogynist it is for women to be in the military at all.

g) [When Sweden tried 'feminist show shoveling', the results were predictably shambolic and required a massive expense to correct.](#) Yet, other countries continue to repeat the same experiment with predictably consistent failure, at the altar of 'feminism'. In a similar vein, [a 'feminist' bookstore went out of business, and the owners blamed men for not donating enough to keep the ill-conceived enterprise alive.](#)

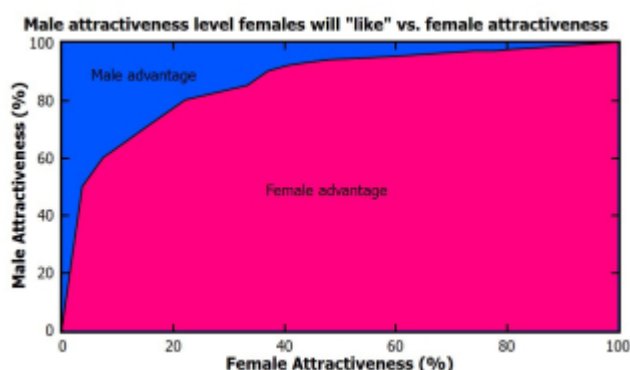
h) [Amazon created an AI hiring tool to present candidates without bias.](#) Amazon assumed that this would lead to more female candidates, since they entirely swallowed the fiction that women are oppressed in the job market. On the contrary, it highlighted fewer female candidates than before because it is in fact men who are facing adverse

bias, which led to Amazon discontinuing use of the tool rather than question their 'feminist' narrative. Small companies and non-Western companies should use the tool, since it clearly does work. More importantly, as AI is used in more and more decision-making processes, the equalization of how people are treated will remove a lot of FI-derived privilege.

i) Much is written about Women's sports. Lost amidst that is coverage of how even endeavors that have nothing to do with physical ability and have no barrier to entry nonetheless have almost no women among the high achievers. **Under 2% of Chess Grandmasters are women. Almost none of the top Scrabble champions are women.** Lastly, why are 80% of Olympic medals won in Equestrian events won by men? Women should be equal in at least Equestrian and horse racing, should they not, particularly given that lower body weight in a jockey is an advantage? Or are horses sexist towards human females too? In fairness, this is only partly due to innate inability. The second factor is that since a woman's social status is not boosted by such accomplishments the way a man's is, fewer women choose to pursue these areas, which is an entirely rational choice once one declines to be a pawn for 'feminist' fight-against-nature objectives. #GenderRealism.

j) Women are far less capable of comedy than men are. Take any improv environment (such as the television program 'Whose Line is it Anyway'), and the talent gap is conspicuously evident. **When a 'feminist' who married one of the world's richest men hires female comedians to propagate a myth about female oppression,** the utter lack of either humor or facts (or good looks) is jarring.

k) **A data analysis of millions of student reviews of college professors reveal that male professors are more brilliant and humorous than female professors, while female professors are widely described as rude.** This is telling since over half of the students submitting these evaluations are female, so this is not 'misogynist'.



l) Female hypergamy is real, and technology has exposed this. The data from Tinder indicates a massive skew in which the Top 50% of women focus on the Top 10% of men (male attractiveness being a function of many variables rather than just looks). Contrary to many men in the Androsphere, I do not think this is something for red-pill men to be angry about, for it is not that difficult to be a man who is in the Top 10%, given the total willful ignorance of the majority of men.

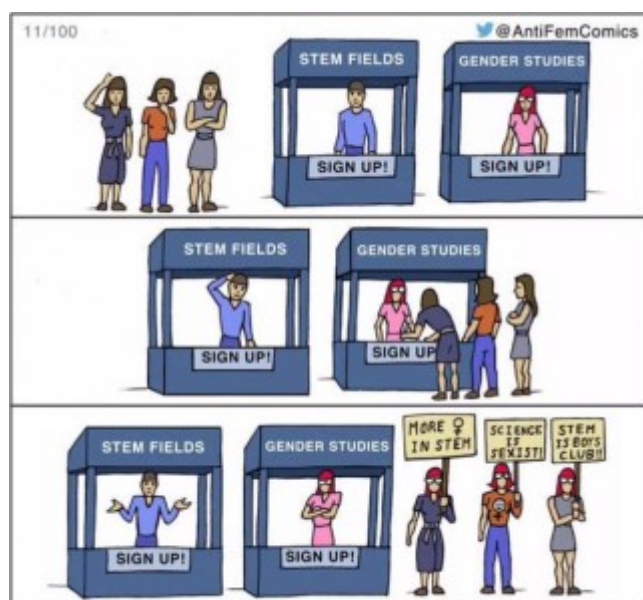
m) The more society changes its laws **to give women what 'feminists' say women want, the more unhappy women become.** Relatively few women truly understand how women think, and 'feminists' are never among these few. See also : point a) within this chapter above.

n) The most fail-safe business opportunities of our time are ones that market to women with a) the reassurance that none of their life choices were ill-considered and no negative outcome was ever their fault, and/or b) the fantasy of living vicariously through some fictionalized ideal that is enjoyed by under 0.01% of women. Use this fact to your advantage, even if you are a woman. Most of the wealthiest self-made women built business empires around selling these messages to average women. A lot of 'red-pill' men whine about misandry, when they could be using this valuable knowledge for lucrative business purposes.

o) Whenever women enter a profession in large numbers, the status of the profession falls in the eyes of both men and women (especially women, because of hypergamy).

p) Women are far less able to separate television from reality than men are, because their view of reality is governed by emotions that television can easily control. This makes women more prone to poor life choices based on a fictional portrayal of that life choice.

q) If 'the future is female', then women ought to be generating the majority of technological innovation and groundbreaking scientific research. In reality, women contribute only a very small fraction of all work towards *useful* scientific and technological advancement, and arguably **obstruct more than they advance**. The future is certainly not female.



The gender disparity in STEM fields explained

r) The push for 'women in tech' is surreal, comical, and extraordinarily expensive (see : [Theranos](#)). It is instructive about how even an infinite amount of money misdirected towards this goal cannot make women anything close to 50% of the tech industry. **There are actually 'studies' demanding that women be given easier grading in STEM classes relative to men.** The ones complaining the most about it **have no real interest in the profession or the subject matter**. They just see money being made, and demand it be given to them simply for being female. 'Feminists' get extremely angry when someone tells *them* that they should "**learn to code**".

s) **The reason the tech industry vexes these 'feminists' so much is because their hindbrain cannot process why money is appearing in the hands of men they find insufficiently attractive.** This short circuits their biologically-hardwired understanding of the natural order from the realities of prehistoric times, so they see their urge to seize the money for themselves while destroying the livelihood of these men as restoring the natural order. Since technology would no longer progress if 'feminists' gained too much power, in tech terminology, one can fairly say that their brain-vagina interface is obsolete.

t) If a woman has a sincere interest in and talent for technology and wishes to pursue a career in a technological position without any special treatment (about 10% of women, almost all of whom had fathers who were scientists or engineers), she will have no greater encourager than me. However, the push by 'feminists' to force women into the technology professions (which the 'feminists' themselves had no aptitude for) is particularly cruel, as they are forcing young women into *a field they are not interested in*, which is a terrible disservice to one's entire sense of professional being. So much for being 'pro-choice'.

u) Even I thought it was only quantitative or analytical subjects that women were unsuited for, **but it turns out there are even demands for Greek and Latin to be made easier so that women can pass the classes**, which they are apparently unable to do at present.

v) The '**It's not about the nail**' video is an exceptionally accurate depiction of female psychology. Men, if you want to infuriate a woman who has a problem but refuses to fix it, nothing will make her angrier than if you helpfully

state "What you need to do to fix your problem is....". The blue-pill male brain cannot grasp why a direct, swift solution to the problem at hand is the last thing a woman wants to hear, but men who have had sex with a lot of women are in table-pounding agreement. If you want to make the woman attracted to you and very aroused, intersperse a mixture of teasing, disinterested indifference to her problem, and rare, unpredictable instances of empathy in your response to her situation. See 'Game' below.

w) The word 'mansplaining' itself is an admission by 'feminists' that **they cannot permit facts and logic, which 'feminist' premises can never withstand**. A related point is that there are still many 'feminists' who cannot spell the most important word in their vocabulary, with 'mysogynist' or 'mysoginist' being typical. Many of these 'feminists' have consumed \$500K+ of educational resources paid for by the taxpayer and/or their fathers, yet are still functionally illiterate. Do you know how many rural girls in a poor country can be given basic (real) education for \$500K? See 'P1W' below.

y) Just view **this video from CNBC of women who think they are making a persuasive case about the existence of the imaginary 'pay gap'** but are really demanding that they be paid for time they are not working. They truly have no idea why an employer would create a job in the first place. In a similar vein, **there is a version of Monopoly that pays women more for achieving the same milestones, yet is marketed as being more fair, not less**.

z) The 'fair sex' is actually the unfair sex. Most women truly do not want the bottom 80% of men to have the same basic rights as the top 20% of men. Virtually no men believe that a woman's human/legal/property rights should be contingent on her attractiveness, but women do believe this about men. Central pillars of the justice system of any advanced society are in direct conflict with how women think right and wrong should be decided.

13) The Fabric of Humanity :

a) In the **Misandry Bubble**, there was a section of how the fabric of humanity will tear under the strains that the growing obsolescence of the human brain regarding the Female Imperative (FI) places on our systems of governance. 'Feminism' is just a modern manifestation of the FI that was hardwired into the human brain from the beginning. **The Misandry Bubble was similar to other economic bubbles**.

b) Women, as the scarcer reproductive resource, were naturally and justifiably seen as more valuable to human survival. If half the men in a tribe died, the number of babies born would still be the same. But if women started to die, the number of babies born would correspondingly go down. Plus, since infant mortality was 50% or more, this resource allocation was justified.

c) For the first 99.9% of human existence, material prosperity was low and human expendability was high, so funneling all resources to women correlated directly with the survival of children, and additional accountability was not necessary. This was the right priority at the time, and the correlation was tight. Only recently has this correlation decoupled, which is why the hardwiring of the human brain, where both men and women put the well-being of women ahead of those of men and even children, still persists.

d) Women now use only 10-20% of their reproductive capacity, with many using zero. Yet, the unquestioned diversion of resources to women (including those too old to have children) remains the same. This is not to suggest that women should return to the old days of high birth rates, but that the instinct to divert the majority of society's resources to women no longer serves its original purpose. Since baby production rightfully declined to replacement levels or less, the resources diverted to women should proportionally reduce as well.

e) Hence, instead of helping children, this money now finds its way to women who spend it on themselves. Thus, we see endless consumer products geared towards women, and a shadow state designed to transfer all costs and consequences away from women. Resources that should be going towards children instead find their way into luxury goods that men don't want (about 90% of the items in any department store).

f) Beyond just consumer products, this appears in the National Debt. Since most government spending is a direct

transfer from men to women, the National Debt is a part of that resource misallocation. In the 10 years since I wrote the Misandry Bubble, the US National Debt rose from \$12 Trillion to \$23 Trillion, almost all of it representing a transfer to women. Now that the Federal Reserve has kept on printing money, the correction of this misallocation is delayed.

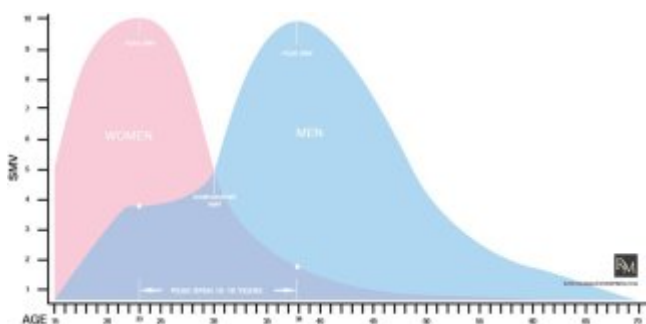
g) In addition to VR Sex as a corrective technology, 'feminists' are already complaining about **how Artificial Intelligence arrives at 'sexist' conclusions**, since the **data it studies is gender normative**, and **there is not enough money in the world to inject the massive artificiality of 'feminism' into every photograph**. Since an AI **has no reason to comply with impractical demands**, the invisible hand of the Female Imperative will erode when AI diffuses into millions of small decisions across the economy.

h) This is a stark demonstration about how a major aspect of the human mind is obsolete. When this resource misallocation corrects (as all resource misallocations do when enough time passes), it will be among the most turbulent events that humanity faces. The fabric of our previous humanity will be torn asunder. What emerges after that may be very different, but resource misallocation away from people moving society forward, and towards people who contribute nothing to societal advancement, will no longer be the status quo.

i) For this reason, simply being aware of the FI, unlike the others who cannot notice it any more than they notice the air they breathe, puts you in the echelon of those who have evolved the furthest from obsolete human evolutionary psychology. Anti-misandry is thus the most advanced level of socio-political awareness to date.

14) Advice for Young Women :

This section will get plenty of hate, even though none of this advice is unusual by the standards of anyone's grandmother, or any contemporary women outside of the Anglosphere West. But I hope I can save thousands of young women from ruining their lives by listening to either 'feminists' or cuckservatives.



a) This chart is the most important chart to help guide your major life decisions. A woman's SMV (sexual market value) peaks much sooner than a man's. It is almost always far easier for a woman to marry before the age of 25 **than it is after the age of 30**. Plus, fertility starts falling by age 27, and is all but gone by age 35. As evidence, no cryobank accepts egg donors over the age of 27, so don't be misled by media propaganda that implies getting pregnant after age 35 is effortless. At least freeze your eggs before you turn 28, so you have the option later.

b) Men prefer slender, pleasant, debt-free virgins without tattoos, short hair, piercings beyond the earlobes, or 'feminist' indoctrination. Anyone who disagrees with this needs to first start persuading people in non-Western countries to change their minds about their preferences. The good news for immigrant women is that they have to do very little to out-compete American/British/Canadian women who have chosen to drift away from this description.

c) Put another way, an attractive young woman who deliberately worsens her appearance, or even allows herself to become fat, is analogous to a young man who inherits \$10 million and squanders it. Female weight-gain is described as a 'fatocalypse' or 'fatastrophe' for good reason.

d) If you are young and heed a) and b) above, it has actually never been easier for an average young lady to get

married to a good man and have a career. All you have to do is resist the social pressure to make bad (i.e. 'feminist') decisions. More simply, if you have a grandmother who never divorced your grandfather, almost all life advice she gives you is going to be better than what you will get from 'modern' sources.

e) Candace Bushnell, who achieved one-in-a-million career success, **still admits that she regrets putting career over having children**. Think about that, and consider that she could easily have had both with better management of her life.



f) Getting involved in 'feminism' will, among other drawbacks, make you far more accessible to predators, both **male** and **female**, since it is an ideology accustomed to immunity from accountability. Yet another reason to steer clear. Be wary of organizations that say they are not 'feminist' but still espouse the same beliefs, as they are havens for predators all the same.

g) A woman can only have sex with one to five men before irreversibly damaging her chances of bonding with *any* man. This may be unfair, but blame mother nature. More importantly, every traditional culture in the world was fully aware of this, and structured society to prevent this from being a frequent occurrence. This is also why marriage traditionally happened before a woman turned 25 (and often a few years sooner than that).

h) A single mother (not a widow) will always suffer catastrophic damage to her future romantic prospects. Almost all men who have any options would prefer to marry a woman who does not already have children. On top of that, pickup artists know that single mothers are ideal for tactical practice and one night stands, after which they can focus on the women they actually want relationships with. If you think the 'child support' payment stream is free money, remember that it ends after the child comes of age, and the now-adult child will eventually demand to see an accounting of if it was, in fact, spent on him/her. If you have more than one child, the chance of at least one demanding to see how you spent the money is even higher. Don't get pregnant out of wedlock (and don't divorce your husband if you have a child with him), just because you see a wealthy celebrity do it.

i) Any woman who wants to be taken seriously as a professional must dispense with any belief in, or mention of, the imaginary 'pay gap'. This myth has been debunked so many times (**including by many women**), and fails the standards of basic logic and financial literacy so totally, that it is often an effective filter that helps separate intelligent women from 'feminists'. Most employers, including female employers, will not hire a woman who they suspect truly believes that there is a 'pay gap' that the government must rectify. This is the absolute last type of person anyone wants involved in their business.

j) The careers where women have the greatest aptitude gap in relation to men are the math-heavy careers (Quantum Physics, **Astrophysics**, Engineering, Economics, etc.). Science-oriented careers where women may underperform by far less are Biology, Pediatrics, Optometry, Organic Chemistry, etc. To go into a career in which female talent is the least competitive relative to that of men (even if extreme levels of scholarships and other affirmative action are available) is the mental equivalent of competing against men in a strength-heavy sport (such as boxing or NFL football). Don't risk your precious happiness and self-esteem just to be a pawn that exists for the edification of 'feminists' who themselves did not choose to pursue any of these fields. Refer to the 'Women in STEM' cartoon

above.

k) An *attractive* woman, in this day and age, can actually earn money by starting a YouTube channel of her doing what makes her attractive. This is done most easily if the videos are of an instructional nature (which, of course, makes more women attractive by learning from the videos). The number of women who earn money from fitness, yoga, cosmetics, fashion, and dance channels on YouTube seems to be very high. The creators earn money by upping their game, while the viewers learn from them. This market is not saturated at all yet, so more women should be encouraged to enter the market and produce their own channels. If a woman has too inflated an assessment of her appearance, subscribers fail to arrive and she gives up, ensuring a swift and fluid meritocracy at global scale. This practice and flow of funds makes 'feminists' livid. Expect them to make some headway in shutting down these income streams for attractive, self-made female entrepreneurs in their tireless quest to uglify the world, and expect there to be a backlash. YouTube/Instagram could be the battlefield **where attractive women team up against 'feminists'**.

15) Beta Males (and lower) :

a) Despite the vast amount of valuable information available online, and the fact that **The Misandry Bubble** is widely seen as the manifesto for a movement that now involves millions of men, there are still hundreds of millions of men who are painfully clueless about these basic facts. Before the Internet age, being this ignorant was excusable, but now, the solution to most problems a man faces is available within seconds. Thus, if a man in 2020 onwards gets into trouble by way of entering into a situation he could have avoided through the knowledge available online (such as getting married in an Anglosphere Western country), our sympathy for him should be limited. Men getting in trouble today from situations they entered into 20 years ago are a different matter, but the gradient of sympathy and level of self-learning expect of the man adjust proportionately.

b) For this reason, any moderately attractive unmarried woman can set up social media accounts and keep posting photographs of herself, while hiding any boyfriend (but informing him of this if they are steady). Then, whenever a major expense arises (such as a traffic ticket), she can appeal to her beta male fans to cover her expense. If a woman has sufficient fans, she will get at least one volunteer. The woman should thank the volunteer publicly on her social media, thereby encouraging future donors. In the mind of the beta male, his financial donation actually inched him closer to romance with her (even if he is thousands of miles away), while in reality, the woman felt no such urge towards him. It is not unethical, since no contract has been entered into; it is a donation. More importantly, there needs to be more of an unofficial tax on betatude. Anita Sarkeesian (who isn't even attractive) **received \$158,000 from beta dupes just to produce 12 videos** that most people could produce for free. I can't blame her for harvesting the beta males who were begging for it.

c) Technology industry billionaires are among the most 'beta' men around. The pattern of a famous eleven or even twelve-digit technology titan, who is neither old nor ugly, ending up with a very average-looking woman with no impressive talents is now an infamous cliché and popular Internet meme. Some of these women **don't even take the husband's last name**. Others gloat about how they make their whipped centibillionaire husband acquiesce to petty, impractical demands, even when they already have staff on payroll to do these mundane tasks. Even worse, the current richest man in the world has an extramarital affair with a woman who is nearly 50 years old, and makes the most needy, cringeworthy, maladroit overtures to her, due to which she rejects him. These overspecialized nerds have singlehandedly devalued the very status of being a multi-multi-billionaire by doing far worse with women than a financially broke bartender, musician, or photographer the same age. There are certain ineptitudes that money simply cannot cure. No wonder the 'women in tech' racket has successfully extorted so much. Similarly, in defense of average women, I don't think the majority of women are gold-diggers outright, since there are clearly some men who attractive women don't want no matter how much money they have.

d) US 'conservative' men are even worse, for they have gone to great lengths to package their cringeworthy woman-worship, often accompanied by **new anti-male, socialist legislation**, into a **pretense of being 'heroic' and 'chivalrous'**,

in order to beg for gratitude from women. They have, of course, failed shambolically in their pursuit of this pathetic goal, while exposing the fraudulent claim that they stand for personal responsibility and accountability. See more about these 'cuckservatives' below, and how to transfer costs onto them.

e) As disconnected as I am from the American dating scene at this point, I have been told there is a new word, 'sneating', to describe women who misrepresent interest in a man just to get free restaurant dinners and gifts. While some women **brazenly gloat about this**, this is another example of where we should no longer have sympathy for beta males. 'Game' advice, available for free on the Internet for the last 20 years, has always maintained that a man should never, ever, be suckered into dinner or other expenses for women they are not already having sex with. Few elements of the different schools of Game thought are so unanimously consistent as this rule. If beta males are still so incurious as to not access this widely available information, they deserve to be a payer of the unofficial tax on betatude.

16) Game :

a) **Game advice has become highly commoditized across the Internet**, which is to say that there is no need to spend significant money to learn some valuable skills. This ought to have caused a wholesale increase in male competence, but as discussed both there and in the Misandry Bubble, about 80% of men cannot grasp that success with women is a learnable skill. When I point out that women are attracted to just the top 20% of men, Game is the tool where you can swiftly enter the top 20% (individual results may vary). Don't worry about too many men learning Game, as that situation is not even on the horizon.

b) Of paramount importance is to always leave them happier than you found them. Any other application is unethical.

c) What 80% of men cannot grasp, 99% of women cannot grasp. If women understood what women are actually attracted to and could view it with the necessary detachment, they would be encouraging men to learn at least the LTR-oriented elements of Game. Remember that despite overwhelming privilege due to pervasive 'feminism', women are unhappier than ever before but cannot figure out why.

d) While few men can or want to be outright pickup artists beyond a 'bucket list' of experiencing 15-25 attractive women, there is obviously immense value in mastering a few basic skills of Game. Making Game second-nature is inseparable from having exceptional communication, persuasion, and rapport skills. As we have seen above, this will provide you with powers that money simply cannot buy. It applies even to platonic relationships with women, as Game principles applied platonically can ensure women at work decide that you are one of the men who should be allowed to earn a living, and they will cut you more slack at performance review time.

e) There are a lot of 'Game denialists' out there, who are often admitted permavirgins, but still insist that only the top few men who have an exceptional combination of looks and money are having sex with all women. The real reason for their denial is because they have convinced themselves, for pain-avoidance purposes, that their failure is due to not winning the genetic lottery. To now provide proof that some aspects of success are within a man's control is something they cannot accept after all that self-deception, as it would mean they wasted the last few decades of their lives. Do not waste even one minute debating them, since that is a minute you can instead spend on your own betterment.

f) Courage isn't quite what people think it is. A soldier who marches towards certain death does so partly because of courage, but partly because his commanders brainwashed him into seeing his own expendability as normal. The same soldier cannot approach women in the grocery store and strike up a pleasant conversation that escalates towards attraction, despite zero risk of any physical danger. The man who can approach women in the daytime at will and consistently generate attraction in them ranks very high in the courage hierarchy.

g) You haven't fully formed as a man until you have done 100 daytime approaches. That in fact means that most

men have not fully formed. After you do this, all subsequent approaches become easy and you will effectively have a superpower compared to most men (and will be able to outperform even tech billionaires on this front, I hasten to add). Doing 100 daytime approaches, and keeping a record of each result in order to identify patterns, is going to make a distinct and permanent change in your life. Don't give up even if you get nothing out of the first 50, 70, or 90. Doing 100 means doing 100. Your attractiveness is rising along the way (provided you are keeping a spreadsheet record to identify patterns and adapting to them), so the best outcomes will be towards the end of the 100.

h) Study **Russell Brand's style of interaction with women**. Obviously don't escalate in any and all venues as he does (you're not a celebrity), but at least try to emulate as much of this style as you can for usage when it is appropriate. This is not the only type of Game, but he is a true master of that particular type.

i) Teach the women you are having sex with to make their beta orbiter men cover various expenses. There are many such 'blue pill' men, especially if cuckservative, who are practically begging for the privilege of covering the expenses of women who are having sex with other men. Their contribution makes this system possible, so I say let them pick up the tab, and have the woman verbally thank them for it (so that they pay next time as well). They *want* to pay, even for women having sex with men other than them, as they have convinced themselves that this is 'chivalrous', so give them what they want, I say. Everybody wins!

17) Democracy :

a) Democracy is merely dictatorship by whoever controls the media. The media can also persuade a significant percentage of people to fill their entire lives with politics, and then tell them what politics *is*, to the extent that these people are entirely programmable on demand. Do not be in denial about this.

b) Decoupling voting from taxpaying is unsustainable by any society. Only current and past taxpayers above a certain cutoff should have voting rights. The premise that the weak will be disenfranchised is greatly exaggerated in relation to the inexorable trend of non-taxpayers voting themselves more money. This error will be corrected in time.

c) A society where comedians are not permitted to make fun of obesity, homosexuality, bossy women, and effeminate men is a society that will soon become joyless on every level.

d) Women who marry with few to zero prior sexual partners will merely copy their husband's political opinions verbatim. 90% of the time, this creates a net improvement over a single woman's political opinions in terms of views compatible with societal sustainability. This was one of the reasons marriage was invented. It is also the reason marriage is being deliberately destroyed by Western governments.

e) A lot of American 'conservatives' are irretrievably convinced that capitalism and democracy are inseparable, since for them, the Cold War coincided with the best years of their lives. In reality, the two have no correlation, and, over time, potentially an inverse correlation. The premise that 'democracy' should be installed by force in the Islamic world, that too as decided by US 'conservatives' who don't even understand their own country and the effects of late-stage democracy, was an epic combination of arrogance and ignorance.

f) Whatever form of 'Democracy' is functional, what is certain is that the framers never intended for Presidential campaigns to last almost two years.

g) In America, your local Mayor, Police Department, and City Council have more direct impact on your life than the President of the United States. But the media has to fill thousands of hours of volume, so they have forced people to think about Presidential politics to an extreme degree. This is *not* what the framers intended back in the late 18th century.

18) The Two-Party System :

- a) **The afterparty is the one you want to attend.** Both parties will cater to those who purchase their goodwill. The fierce rivalry is just theater to whip up the rubes and keep them divided. Any civilian (i.e. someone not earning a paycheck from the political system) who gets extremely emotional about the victory of one party over the other in US politics is a fool. Most children figure out that pro wrestling is scripted by the age of 12, but many 'adults' still can't figure this exact same thing out about the two-party system.
- b) Much is written in America about how the two-party system is better than a multi-party system, such as how a small 'kingmaker' might get too much power in the latter. However, in the age of social media, it is evident that the two-party system is most easily reduced to the lowest common denominator by the new medium.
- c) In any industry, if a duopoly of just two market participants existed, then one would expect both to deliver ever declining quality, as each tries to be slightly better than the other while both decline. If the political process now supports an entire profit-seeking set of industries that were not envisioned at the start, why would one expect a political duopoly to be any different?
- d) As stated by GK Chesterton: *"The whole modern world has divided itself into Conservatives and Progressives. The business of Progressives is to go on making mistakes. The business of Conservatives is to prevent mistakes from being corrected. Even when the revolutionist might himself repent of his revolution, the traditionalist is already defending it as part of his tradition. Thus we have two great types — the advanced person who rushes us into ruin, and the retrospective person who admires the ruins. He admires them especially by moonlight, not to say moonshine. Each new blunder of the progressive or prig becomes instantly a legend of immemorial antiquity for the snob."*
- e) A 'tough on crime' conservative is the police-state leftist's best friend.
- f) Cuckservatives who openly root for the notion that California should leave the United States (as if the leftist advance that happened there is not also happening in Nevada, Arizona, and Colorado) are no better than Democrats who want to abolish the Electoral College. Each are trying to change the system since they cannot win on ideas.
- g) **I correctly predicted, nine years ago, that Republicans would not shrink the size of government.** Okay, that was a pretty easy prediction, but the poll in that article indicated that there still were some hopers. But at this point, they don't even pretend to try anymore. A cuckservative's highest goal is to appear 'chivalrous' to women, which he thinks comprises of using the state to transfer resources from men to women without any reciprocal contribution from women. Under such a worldview, government spending can only rise. Remember, a leftist can get a cuckservative to support any government expansion (even something immense like the Green New Deal) by packaging it as something 'chivalrous'. Under that framing, a cuckservative always jumps up to out-left the leftist.

19) US Conservatism :

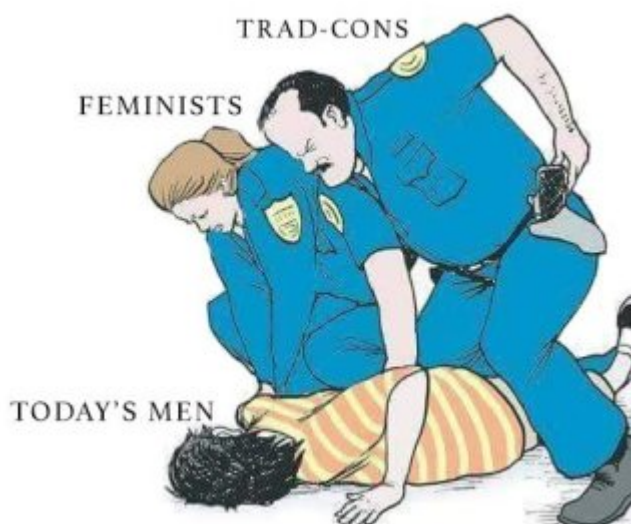
- a) 'Conservatism' is a bizarre consciousness in the United States, the equivalent of which does not exist in most other countries at anywhere near the same scale. It is not an ideology, but rather the absence of ideology, contrary to what a conservative may claim. Most conservatives do not stand for any absolute standard of free markets, small government, personal responsibility, or 'traditional values'. The conservative merely wants to preserve selective aspects of the recent past, *but never the more distant past*. Hence, the conservative's view of an ideal society always drifts leftward, and the conservative finds himself advocating for what leftists were advocating a short while ago, while pretending to be doing the opposite.
- b) Even more strangely, many staunch conservatives have no awareness of their own perpetual leftward drift. Furthermore, since the rate of change is ever-rising, the time period that they wish to preserve is less and less distant from the present. At this point, many conservatives merely seek to slow down (but never halt, much less reverse) any leftist advances, so are merely left-wing individuals without realizing it. They could not even conserve the definition of 'man', 'woman', and 'marriage', yet do not seem troubled by this retreat. **Conservatives have even**

become increasingly shameless about groveling to 'feminists', yet believe that they oppose 'feminism'.

c) Hence, most conservative protests in the face of leftist advances are highly ritualistic, orchestrated, and **always end in a predictable surrender, after which the conservative will actually work to preserve the very leftist gains that they were previously displaying token resistance against**. For this reason, conservatism, **as a political faction that outright seeks to be on the losing side, is not attractive to people who dislike losing**. This, among other things, explains the extreme hatred some 'NeverTrump' conservatives have for President Trump, even if the former are ostensibly 'Republicans'. His 'so much winning' slogan alone goes against the very mission statement of conservatism. This also explains the big 'mystery' about why Asians and Hispanics don't vote Republican (at least, surrender-Republican). Why associate with a group that likes to lose, and is adept at ensuring they are widely hated from all sides?

d) For this reason, the pejorative term 'cluckservative' is startlingly accurate in describing the more surrender-loving, whipped subset of conservatives. Their strategy to brand themselves as virtuous by taking the 'turn the other cheek' philosophy to ridiculous extremes has failed spectacularly, as no one is fooled by their attempt to repackage extreme cowardice and needy approval-seeking as virtue. In fact, I am going to take it further and add the letter 'l' in there to create the new term 'cluckservative', as the element of cowardice has not been flagged enough yet, and they deserve further ridicule amidst the judgement of history.

e) As mentioned above, many cluckservatives actually wish that California would leave the United States (a 'Calexit'). While no man with an iota of self-respect or courage would want a piece of their own country to leave, what is particularly shameful about this is that California was, in fact, a 'red' state until 1988, and drifted leftward due to perpetual cluckservative retreat. Their premise that the removal of California from the US would somehow restore some past paradise in the other 49 deliberately ignores the fact that the same cluckservative retreat is already underway in Nevada, Arizona, Colorado, Florida, Texas, and more. Should they all leave? Cluckservatives, hence, are the Neville Chamberlains of our time.



f) **Cluckservatives are the eager anvil to the 'feminist'**

hammer. The most brutally anti-male and unconstitutional laws have been invented not by feminists, but by cluckservatives, in their mad quest to appear 'chivalrous', under the extraordinarily misguided belief that women will be impressed by this and will finally become attracted to cluckservatives. In reality, women are repelled by this cartoonish parody of 'chivalry'. They have perverted both Christianity and marriage into their ideal of woman-worship which they wrongly describe as 'chivalry'. These cluckservatives also possess an extraordinary hatred for husbands and fathers. Read [here](#), [here](#), and [here](#) for more. Again, these same cluckservatives actually claim they are against 'feminism', while they enthusiastically make it even more pernicious, sadistic, and ghastly.

g) Therefore, don't ever let a cluckservative claim that they stand for 'family values', or that voting Republican is somehow evidence of being against government involvement to further 'feminism'. **They have devised and**

engineered the wholesale replacement of marriage with the child support model, while denying that any such change ever took place. Even radical 'feminists' could not have designed a government artifact so precise and diabolical, as these 'feminists' don't interact with enough families to know how to so efficiently concoct the legislation that removes the father from the home, takes his income under threat of imprisonment, exempt the woman from any obligation to prove it was spent on the children, while still ensuring the father is still seen as evil. It takes a cluckservative to destroy the family.

h) Cluckservatives are the primary perpetrators of the claim that men are weak and lazy if they do not put female-centric goals, however untraditional and unnatural, ahead of their own well-being. Don't be surprised to learn that 'pro-life' cluckservatives are even more misandric, and less willing to hold women accountable, than Democrats. Every supposed principle that a cluckservative claims to uphold, such as matching authority with accountability, creating the right incentives, and the need for contracts to be enforced is jettisoned when the prospect of bashing men arises, and the cluckservative instead adopts the same arguments as a leftist advocating an 80% tax rate.

i) Hence, contrary to what they claim, cluckservatives are strident socialists, as long as one strict condition is met. This condition is that only men be net payers, and only women be net recipients within their socialist vision. Once this gender requirement is fulfilled, cluckservatives are indistinguishable from socialists and communists. See this infamous video again, and note its downvote ratio, for proof. Cluckservatives even love debtors prisons and quasi-slavery, under this gender requirement, as made possible by the grossly misnamed 'child support' system they have devised as a Trojan horse to replace marriage. This is very different from the tax on betatude that I favored above. Cluckservatives want to tax the *best* aspects of masculinity on an *imputed* basis to fund a system devoted to ensuring that single mothers are seen as paragons of virtue rather than welfare queens, and then express puzzlement when masculine generosity starts to become scarce in society. This is how cluckservatives end up harming everyday women too.

j) Cluckservatives are so fanatical about their demands that men other than them bear the costs of their 'chivalrous' fantasies that the Editor of the National Review (the how-to manual of cluckservatism) expects men to voluntarily die in a sinking ship even if all the women are already safe and the men could also escape with safety. Cluckservatives often outdo even 'feminists' in their lust for normalizing male disposability (as long as it is not them, of course). The rush into wars like 'Operation Iraqi Freedom' were also driven partly by this zeal to send young men to die so that cluckservatives could claim that *they* are 'chivalrous' for sacrificing your son, brother, boyfriend, nephew, etc.

k) It is common to see extreme Dunning-Kruger manifestations among cluckservatives amidst their displays of cartoonish 'chivalry'. For instance, take Jim Geraghty (pronounced 'Gay-ratty', appropriately enough), who married a single mother despite being a well-known public figure (i.e. he voluntarily self-cuckolded), and all but admits that he is threatened with divorce often. Yet he makes a bizarre and nauseating video that insists society considers losers like him to be the epitome of 'sexy masculinity' as he describes it. The infamous, full-time W. Bradford 'Wilcucks' insists that forcing government involvement in relationships is the key to becoming a 'real man', and has taken to hectoring A-list male celebrities to enter a government contract with women they have children with, while deliberately omitting extremely important facts amidst his 'advice'. These cluckservatives go to great lengths to assert that they are the most exemplary, masculine men around. Physiognomy is real, and a mere glance at the unmasculine, flaccid, untrustworthy visages of Gay-ratty and Wilcucks might make it difficult to suppress your laughter at the extraordinary Dunning-Kruger delusion on display. A Mount Rushmore of cluckservatism could be sculpted from Play-doh.

l) Cluckservatives whine about Democrat-favoring bias in the media, or being deplatformed by Democrat-biased tech companies, even though they tend to converge to the Democrat political position anyway. In their 20 years of whining, they did not create their own alternative media system of equal power. Whether it is because they don't have the collective expertise, are lazy, or prefer to play the victim is secondary. The reality is, they don't want it to be any other way, as per point c) above. Judge them by their actions (or lack thereof), not their mendacious words.

m) Mark my words, in the near future, a cluckservative will loudly demand that men enter a government marriage contract with MtF transgender individuals (i.e. they still have XY chromosomes) who identify as 'female'. The cluckservative will cartoonishly gloat about how much he is doing to uphold 'traditional marriage' without seeing anything odd about pressuring men to enter this arrangement. *"So what if she was born a man? You will only be a real man if you marry her!"*, they will bellow. To be clear, I am not criticizing the transgender person (who is just being used as a prop), but rather the cluckservative.

n) If you are wondering why I am giving this much space to demolishing this already universally despised group, it is because it is on the brink of total collapse, and without the cluckservative anvil, the 'feminist' hammer will not be able to propagate nearly as much misandry. Cluckservatives are the pharisees of today. Many men have thankfully stopped following, and therefore a major realignment that ejects cluckservatives into the dustbin of history is imminent, wherein there is an opportunity to fill the vacuum with something better (race nationalism, **another goddess-cult ideology populated by even less impressive men, and therefore no women**, is *not* it, as it languishes in an even more primitive layer of the human brain and thus has an even higher 'loser quotient').

o) Lastly, remember to call them 'cluckservatives' and point to this SEO-optimized list for reference. That will cause a 'Streisand effect' that hastens their welcome demise from political relevance and makes misandry harder to propagate. If you question whether the Misandry Bubble has in fact partially popped, as predicted exactly 10 years ago, the ongoing implosion of the once-powerful phalanx of cluckservatism is a reliable metric that it has. If you are looking for a way to fight back against misandry, you will make much more headway attacking cluckservatives than attacking female 'feminists', since women already have a low opinion of cluckservatives. Remember to train women you are sexually involved with to get cluckservatives to platonically cover some of her expenses while feeling privileged to do so, as described above in 16(h).

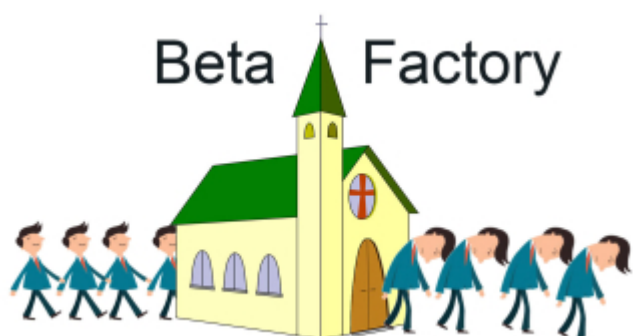
20) Islam :

a) My religion of Islam is widely misunderstood in the West, by both leftists and chickenhawk cluckservatives. There are many variants of Islam, and many amalgamations of it with pre-Islamic cultures in areas that became Islamic. Yes, extremists are a small but significant percentage of Muslims, and moderate Muslims do not do enough to purge them. But this is because the average Muslim is politically unsophisticated and cannot see beyond supporting his own side, rather than a desire to kill innocent non-Muslims. Consider it to be an issue of low political and civic sophistication, rather than calculated malice.

b) If even 10% of Muslims were terrorists, there would be dozens of terrorist attacks per week the world over (including in the West). This, obviously, is not the case.

c) Muslim countries do not even have high murder rates. No Muslim country not in a state of war **has a murder rate comparable to what is found in Latin America, the Caribbean, or Sub-Saharan Africa**. The largest Muslim country, Indonesia, has a lower murder rate than most European countries.

d) Islam is winning the game of 'the future belongs to those who show up'. As I wrote in **The Misandry Bubble**, this takes just two generations. At this point, one of those two generations has already been created.



e) Of course **Islam is right about women**. Why wouldn't it be? Christianity is right about women too, except that Westerners no longer practice Christianity, they just pretend to by hollowing out Christianity and stuffing the shell with 'feminism'. I am surprised that it took until 2019 for such flyers to be posted, as **I kicked off the campaign to do this way back on 1/1/2011, or nine years ago**. Post more flyers!

f) Over two thirds of Westerners who convert to Islam are women, and the rate of conversions is rising. Mention of this causes the typical blue-pill cluckservative Republican's head to explode. This, however, is no surprise to anyone who understands female psychology (see 12(b) above). Islamic teachings do have principles in them that are repeated in what some people call 'Game', thus instilling a level of natural Game into Muslim men.

g) Contrary to the myth that cluckservatives try to perpetuate, the only Islamic countries that mandate burqas happen to be absolute monarchies, which are under 10% of Islamic nations. A hijab is not a burqa, and is usually not face-covering. By contrast, look at how many women voluntarily choose to wear it even where they don't have to. The fact is, the burqa is most zealously enforced by older women, not men, onto young women. See the SMV chart above.

h) Despite all this, I do not advise Western men to convert to Islam if your only goal is to escape misandry and marry a Muslim woman. There is far more to the religion than that, and it is not a religion for those who may regret having converted. Plus, you won't fool other Muslims about your true agenda. Believe me, I could make an obscene amount of money publishing a YouTube channel and how-to guides that help Western men convert to Islam, learn a bit of the Quran, learn a bit of the language of the country they wish to reside in, and expatriate to Kuwait, Qatar, Saudi Arabia, the UAE, Malaysia, Turkey, etc. where they would have a high-paying expat job. But the locals just won't fully accept you, which will only become apparent years later. That is why it would be wrong of me to peddle that.

21) Post-First World :

a) People sometimes say that the US/UK/Canada is becoming like a 'third world country'. Aside from revealing how outdated their Cold War-era terminology is, this reveals how little they understand about either type of society. In reality, countries like the US/UK/Canada/Australia are spending all of their resources in an ill-conceived fight against nature itself. Very unnatural conditions that could never exist in a society less prosperous than these are being normalized through extremely huge expenditure. 'Feminism' is the biggest of these unnatural abominations, but many others are part of the new left. For this reason, it is more accurate to describe these countries as 'Post First World'. As an acronym, we can call that #P1W.

b) A P1W country, thus, has some aspects that match a poorer country, such as crumbling roads and unreliable electricity grids, and **others that are uniquely present** (and only possible) in a place where actual hardship is too far in the past for most people to remember, rendering them completely unmoored from any concept of what keeps a society running. Hence, taxpayer resources are spent in an unwinnable quest to fight nature itself, where preposterous resource misallocations to prop up bizarre ideologies are ubiquitous. Since too many non-taxpayers have the right to vote, taxpayers are treated as golden geese to be extracted from without remorse.

c) To give you an idea, P1W priorities are why, instead of having cities on the Moon and a cure for cancer, the West instead spent those trillions of dollars on subsidizing single motherhood/destroying fatherhood. Similarly, in a poor country, the poor people are emaciated and stunted, whereas in a P1W country, they are often obese, and those trying to 'help the poor' insist that obesity be normalized. History will not judge this era of these countries favorably.

d) If you ever get a chance to speak with a male park ranger in a P1W country, ask him how many times a foolish visitor (almost always female) reports to the ranger that a coyote had a dead rabbit in its mouth, or that a hawk killed a squirrel, expecting the ranger to intervene. A hallmark of a P1W society is a complete ignorance of nature, and how the ranger is meant to be the 'police' that prevents predators from 'harming' prey. Each of these women

might have consumed \$500,000 or more in educational cost, paid by taxpayers and her father, only to be this ignorant about what actually happens in nature, and this accustomed to a government employee existing only to intervene in every perceived problem.

e) In 2001, when the Taliban in Afghanistan destroyed the pre-Islamic statues of Buddha in that country, I was appalled that they could not see the value of preserving a historical treasure and only saw a history that must be erased because does not fit their 'contemporary values'. At least more enlightened Islamic countries were not doing the same (Egypt is not tearing down the Sphinx and Iran is not tearing down Persepolis). But would you like to know who is actually on par with the Taliban? **In 2019, we see San Francisco deciding to paint over a mural of George Washington** (and somehow charge taxpayers \$600,000 for this). Cries among **the US left to tear down Mount Rushmore grow louder each year**. The British left also has an obsession with removing old statues of historical significance.

f) Almost all television and radio commercials produced in America today, if narrated by a male, have a male with an unusually high-pitched, androgynous voice that is nauseating to hear. By contrast, view commercials from the 1970s and 80s, which are available on YouTube. There is no androgynous-voiced man as a narrator in any of those.

g) Studies have shown **that physically weak men tend to be socialists (we include cluckservative socialists in this group)**. These studies don't go far enough, because they stop short of revealing that women are socialists for the same reason. Ultimately, the likelihood of a person being a collectivist is inversely proportional to how well they could survive in the jungle for an indefinite period. A man who could manage that situation well (whether due to physical strength, resourcefulness, etc.) is less likely to be a socialist in our modern world. A woman attractive enough to get such a man to take her in and share his resources with her is also less likely to be a socialist, whereas women who are unlikely to attract such a benefactor tend to favor socialism. As far as we may think we are from prehistoric times, 'Jungle Survivability' is still the governing factor in what system a person favors. This is also why people who opposed socialism in their prime become socialists in their old age.

h) As I wrote on 1/1/2011, **the regime that depends on suppressing information always loses to the movement that strengthens with a free flow of information**. The ever-widening range of opinions that are being suppressed in P1W countries is an indicator of how far along they are toward correction.

i) I always found it funny how the people who have the most to lose if America converged to the rest of the world's median cultural norms and tolerance levels are the ones most actively working to weaken America. Perhaps 'self-extinction response' is a feature of their evolutionary hardwiring, as guided by nature, because nature wants everyone else to never stop adapting to threats.

j) While only a few countries are P1W countries, and have only been so for a short time (I would say 2006 was when the US formally crossed the P1W threshold), the outcome of this remains to be seen. Does it get swamped with the most hostile immigrants, or do the sheltered snobs who think they never face the consequences of their society-destroying beliefs finally reverse their positions when they personally start facing obvious costs (which could happen quickly once the cluckservative cannon fodder that shields them is depleted)? Can a P1W country correct course without a massive decline? This is the biggest question of the next decade.

k) And with that, I bid you, my 1 million+ readers, adieu. No more articles by me, as there are just too many opportunities in the real world to pursue as P1W societies correct/collapse, and I recommend you do that same. See you.....out there.



Comments Section : The comments are going to be epic, particularly when we see people who ignore 95% of the publication to screech about one point. It remains to be seen if conversations are even possible, or if excerpts of

just one chapter are the basis for entire comment threads on other websites. As Typepad only allows 100 comments per page, a link to the active page will also be placed upfront.

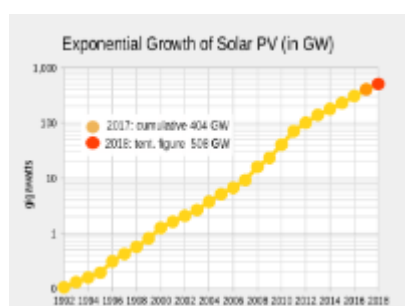
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ATOM Award of the Month, February 2020

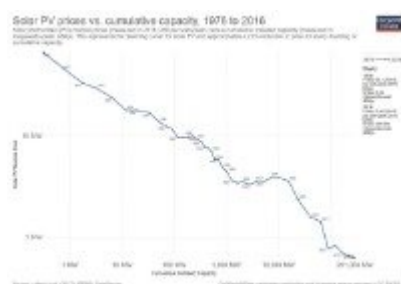
The Futurist · 1 February 2020 · Archived copy · Original

It is time to award a new **ATOM AotM**, and the first one somewhat coincident with the newly published version 2.0 of the **ATOM publication**. This one has been discussed elsewhere on this website, but at the moment, it is perhaps the single biggest disruption in the global economy.

First, a small story. Photovoltaics (PV) is actually my first exponential technology, and what made me aware of the concept in a time when even 'Moore's Law' was not a household term and Intel was a very small company. When I was 10 years old, I wrote a 5th grade paper (about 800 words) on exponential improvement of solar cells of about 5% a year. It predicted cost-effectiveness in the 'early 21st century'. The paper was a hit and was submitted to a contest that all the elementary schools submitted papers to, and I was taken, along with a number of other 5th graders from the Cleveland area to an event where the Mayor of Cleveland at the time (George Voinovich) meets the children and does a photo op. We didn't understand any of that, but each child got a framed certificate.

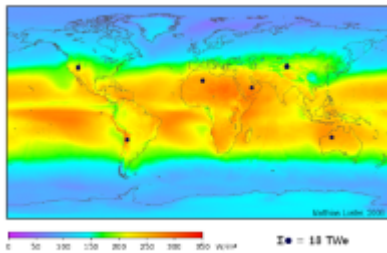


Sure enough, as the decades passed, PV did become cost effective in the early 21st century. It has been a subject on this website for a long time, and while we often point out how many technologies have failed to meet industry-derived projections, [as you can see from this old 2007 article](#), a US DoE chart thought PV installations in the US would be merely 15 to 30 GWs. In reality, the 2020 number is about thrice the upper bound of that projection, at 80-90 GWs, with over 3% of US electricity generated through PV. Even better, the world average is higher than the US average, and the world total continues to grow in excess of 25% a year. Remember that this ATOM advancement is tied to the advancement of electric vehicles, as not merely is crude oil being replaced with electricity. For many countries, the oil was imported, while the photovoltaic electricity is generated domestically. This is a victory against OPEC, as imports from OPEC are being replaced with domestic energy.



As we recall Swanson's Law, the 40-year trend is consistent (note that both axes are logarithmic). While it took decades to get up to 3% of world electricity consumption being through PV, the jump from 3% to 12%+ will not take longer than a few years. The inflection point is here, and the dollar impact is among the biggest of any ATOM transformations currently underway. Even more than the dollar impact, it is the multiplier effect of these specific dollars given where the shift is being generated.

(Images from Wikipedia and Our World in Data. [Click to enlarge](#)).



The best part about solar, which is not true of wind power, is that the poorest countries in the world are in fact the ones with the greatest solar intensity, and are thus the most suitable for solar. Much has been written about why cold-weather cultures have done better than hot-weather cultures on average, but now the very resource that was not being monetized can be monetized. By contrast, wind power, while good, is both slower-advancing and most applicable in countries that are already wealthy, and so does not have quite the same multiplier effect. This map of solar intensity indicates where the greatest utility of photovoltaics can reside.

The absolute lowest-prosperity countries are still too disorganized to take advantage of this, but even the third quartile is well-prepared to rapidly increase PV installations and move away from oil imports. In the near future, it will seem quite absurd that people were importing their energy from thousands of miles away.

Related :

[The End of Petrotyranny - Victory](#)

[The End of Petrotyranny](#)

[Solar Power's Next Five Game-Changing Technologies](#)

[A Future Timeline for Energy](#)

[Why I Want Oil to Hit \\$120 per Barrel \(epic 2007 article\)](#)

Related ATOM Chapters :

[3. Technological Disruption is Pervasive and Deepening](#)

The Accelerating TechnOnomic Medium, v2.0

The Futurist · 29 February 2020 · Archived copy · Original

The time has arrived. The second version of the **ATOM Publication** is now out. This includes about 10% more text, updated data, charts, and incorporation of the Sovereign Venture Fund idea.

The first version got about 400,000 visits, and was featured in a Google Talk and a variety of other television programs. Long-timers who haven't read it in years should give it another examination, while newcomers should dive in deep. We are going to hit a higher level of outreach and PR in the near future, and I may need some volunteers.



ATOM Webcast on Covid-19

The Futurist · 20 April 2020 · Archived copy · Original

The current pandemic obviously has huge implications for ATOM principles, particularly since the Federal Reserve was forced to do what they should have been doing all along, which is a much greater level of QE and lowering the FF rate to 0% permanently. [See the Federal Reserve balance sheet for a dramatic visualization.](#)

I am doing a webcast about all of this on April 24, with some materials also taught in my classes at Stanford. [See here for details, and register if you would like to attend.](#)

ATOM Award of the Month, June 2020

The Futurist · 1 June 2020 · Archived copy · Original

The pandemic has ratified and accelerated a whole host of **ATOM principles**, so I have to update parts of the entire publication. Suffice it to say, a number of pent-up ATOM predictions just got fast forwarded, with a seminal day in the history of economics having been forced into manifestation. We can divide the events into two parts : technological and monetary.

Among technological disruptions, there are three that qualify as having been overdue for a long time, that got tipped over by this catalyst :

1) Video Conferencing : This was **something that Cisco expected to take off 14 long years ago**, but expensive proprietary hardware and the inertia of old habits prevented it from attaining the critical mass necessary for entrenchment. Cisco lost at least \$6 Billion on this endeavor. Now, however, as people are forced to work from home, a critical mass of users have to adapt to this usage, which in turn attracts more innovation and capital to the technology. While none of the companies advancing videoconferencing in 2009 are the same ones as the ones winning now, this is common in the technology sector (recall the search engine wars). **The cascade of disruptions I listed in 2009 still apply.** Among other things, if cubicle-style workplaces can agree that all on-premise meetings are restricted to three days a week (M-W, or Tu-Th, or whatever), then the distance that an employee can commute effectively doubles, and the housing availability for them thus increases 4X. The current status quo of certain real estate being vastly more expensive than equivalent real estate 30 miles further from the jobs cluster may finally correct. This is a form of standard-of-living increase that is poorly captured in GDP statistics.

2) Educational Institutions : **The extraordinarily distorted cost/value equation of both higher and lower educational institutions (which should not be conflated with the concept of 'education') already crossed the point of no return in 2015.** But, as with videoconferencing, too few people were willing to be 'Spartacus' and make use of alternative solutions that were in fact lower risk. This applies to both students and employers, for employers declaring that they will hire based on on-site testing and online certifications, rather than degrees that bear little to predictive value of employee performance, is the catalyst that would have induced more students to bypass the universities-as-gatekeeper oligopoly. The fact that universities want to charge the same tuition for online classes (and are being sued by students disputing this), when comparable online classes are available for orders of magnitude lower prices, is going to reduce US university enrollment permanently. To cope, there is no reason that US universities cannot be forced to return to a 1980s-era cost structure.



Economist.com

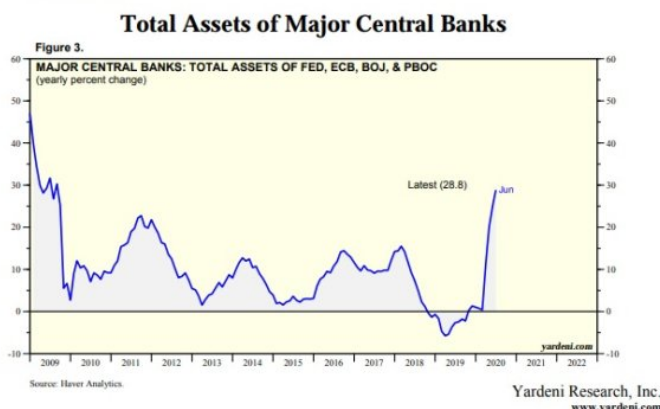
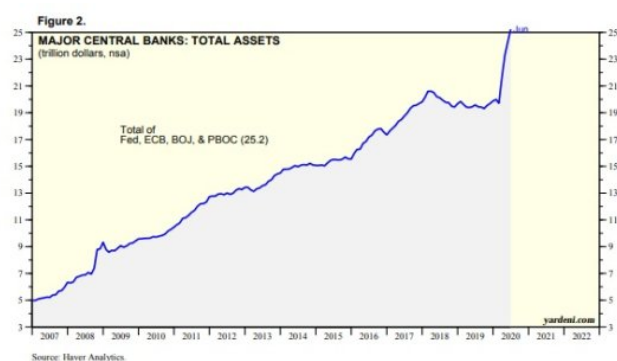
3) Retail Real Estate Re-Purposement : Overlooked

among the technological and economic effects of this black swan is the fact that the 'retail apocalypse' and shift to e-commerce has fast-forwarded to such an extent that millions of acres of US retail land (including parking lots) will never return to previous levels of usage. This was partially mentioned in the **ATOM AotM for August 2017**, and **is often brought up in comments**. E-commerce was still just 12% of all retail sales before the pandemic, but if that 12% were to shift to 15%, or effectively jump two years ahead of the previous trend, that alone is a vast acceleration with visible results for the suburban landscape.

In fact, when you combine the permanently lower demand for premium office space from the greater usage of videoconferencing, and the mass closure of retail real estate (at least in the US, where six times as much land is allocated to retail relative to most advanced countries), the correction and pressure to re-allocate could be extreme. In places like California, the extreme restrictions on new residential construction will be exposed even more visibly as office space joins retail in a permanent glut.

But the bigger event was not even these technological accelerants. Instead, the complete and supreme validation of all ATOM conclusions was manifested fully. Recall that the Federal Reserve **was actually reversing QE and increasing interest rates in 2019**. It had **begun to pause and correct that misguided reversal process, but still at too timid of a rate** of net increase to even keep up with the ATOM trendline of monetary creation required to halt technological deflation.

However, this crisis forced the Federal Reserve to do the right thing, even if they still don't understand the new economics of technology. March 15, 2020, is a day that can fairly be described as the 'Netscape Moment in Economics'. For those who recall the original 'Netscape Moment', on August 9, 1995, the Internet browser company Netscape did an IPO that exceeded its anticipated price by a huge margin, and triggered a boom in Internet company formation for the next 4.5 years. Even after the bust, the economy was permanently into the Internet age. Similarly, 3/15/2020 is the day where the Federal Reserve, in one fell swoop, lowered the Fed Funds rate to 0% (where it should have been all along), and signaled permanent QE. In the following 10 weeks, over \$3 Trillion of new QE was done, and the entire trajectory is starting to look more like the exponential parabolas that we are accustomed to seeing wherever the accelerating rate of change and exponential technology emerge. As of May 31, here are two charts to depict the total QE effect (**source : Yardeni**) :



The first chart indicates the cumulative rise in the

sum of the four major central banks. Note the feeble attempt to reduce the balance sheets in 2018-19, only the forced to return to the trendline. The second chart is the YoY percentage increase. I have always said that the ATOM requires 16-24%/yr as an annual rate of increase to offset deflation and maintain optimal (2-3%) inflation. The increase is now probing the upper limit of even my range, and it will be interesting to see if inflation emerges even then, or if the ceiling is even higher than I estimated (meaning that technological progress is now even faster and broader than before, and monetary creation could be higher than before).

I said elsewhere that the decade of the 2010s had \$23 Trillion of cumulative QE worldwide. The PhD Economists of the world, who have predicted 100 of the last zero bouts of hyperinflation, still believe QE is an aberration and assume that the cumulative QE will be reversed (i.e. that the 2020s will have -\$23 Trillion of cumulative QE). I claim the opposite, which is that under both ATOM principles and the Accelerating Rate of Change, the 2020s will see about \$100 Trillion of QE, **and** that this will move towards sending cash directly to people (rather than the esoteric bond-buying that comprises of QE today, which inevitably concentrates the benefit of this monetary creation in very few hands).

Mark my words. The entire profession of economics, full of PhDs who have never had any contact with entrepreneurs and real-time economic decisions, will be wrong by an epic margin.

ATOM Award of the Month, August 2020

The Futurist · 1 August 2020 · Archived copy · Original

For this month's award, we will delve into a disruption that took place a few years ago, and how that disruption is about to have a second act, accelerated by coronavirus. Hence, it is related to the [June 2020 ATOM AotM](#).

Streaming video has already disrupted the film and television industries completely. Due to recent events, it is now on the brink of its second act.

First, a recap of the first act. Netflix was the first and most well-known among existing streaming services, of which there are now over a dozen. The disruptions inherent to this were immense and across multiple sectors.

[Blockbuster alone had 9094 stores at its peak in 2004, alongside Movie Gallery's 4700, and these were not small stores in square footage and parking lot space.](#) There were other, smaller video rental chains as well. Collectively, they consumed thousand upon thousands of acres of prime urban land. The removal of this entire resource allocation and supply chain was immensely productive, and rapid.

[Additionally, the entire structure of how films and television are produced was upgraded into a more productive version.](#) The old paradigm of 26 episodes per season, and commercial breaks every few minutes was extremely restrictive. Most 'one hour' programs from the 1980s and 90s were barely 40 minutes of real content. All of that has been swept aside with the technological revelation of on-demand streaming. The exceptionally low price of most streaming services qualify as a true ATOM disruption. Try explaining to young people today how, in the early 1980s, people had to rush home to not 'miss' their favorite program or a movie that was being shown on TV for the first time (including commercials for a third of that time).



But the second act is the disruption of the next industry, education, by the same medium. [The seeds were sown in 2015](#), with only the 800,000 Chinese students paying full price delaying the manifestation of this ATOM disruption. Coronavirus has shuttered in-person schooling, which has forced students online. Yet, universities, in their hubris, want to charge the same fee. This invited comparisons that universities are ill-equipped to rebut, and are uncannily similar to what taxi medallions said [when Uber disrupted their entitled status quo](#). Suddenly, questions of both cost and duplication of effort began to move to the forefront.

Annual Streaming Price	
	\$108
	\$72
	\$120
	\$132
	\$84
	\$50,420

The following list summarizes the extent of the mismatch, even though the Harvard 'annual' price actually represents just the eight-month academic year. Furthermore, \$50,000/yr for Harvard is probably still a better value than \$40,000/yr for a university ranked closer to #50. Of course, this table is for dramatic effect, and the disruption is going to be in lower-value education (K-12 and lower-tier universities) first.

Articles written about this disruption have appeared in important non-tech publications :

[The Atlantic](#)

[Harvard Business Review](#)

[New York Magazine](#)

The 'emperor has no clothes' moment for the ridiculously expensive 'education industry' draws near. People are beginning to finally figure out how little value (or even negative value) they are getting for their money, combined with the acceleration of technological alternatives. This is something I have been anticipating for some time, and thus had become one of the most overdue disruptions around.

The key, of course, is for employers to have the courage to buck the status quo. Employers have been unusually timid about hiring entry-level candidates without degrees, or even creating their own onsite training programs.

For example, there is no reason why a large tech company cannot simply hire the 18-year-olds with the highest SAT scores, and put clusters of them into on-site training programs, and even house them in local dormitory-like apartments near the office campus. If the SAT score is not enough info, students can also add a dossier of their accomplishments and a writing sample. Effectively, the college application for which a student pays \$50-\$100 for the privilege of submitting, can be an online upload for free, accessible by login only by verified employer HR staff email addresses. Once hired, the tech company mentors the candidate, and commits to three years of employment, so that their resume is sufficiently solid in the absence of the university credential. Each US military branch has 'basic training' that is of 7-12 weeks in duration, so there is no reason tech companies cannot have a 3-year training program for 18-year-olds. As long as other tech companies recognize the training from the first (Google, Amazon, etc.) as valid, the graduates can circulate throughout the tech industry, and the monopoly of universities is broken.

In addition, the premise that the 'contacts' they make at a university are more valuable than the contacts they make

in their first three years at Google, Amazon, or Tesla is absurd. The truth about college is that a person's best friends usually are not going into the same professional field, whereas this link is met in the training program. Even if their compensation net of free housing is very little, that is still a vastly higher net compensation relative to a university degree. But alas, these supposedly innovative tech companies have not yet demonstrated the courage to bypass college.

Fortunately, the ATOM might do the hard work of normalizing streaming education at the same cost as other streaming content, bypassing the need for employers to wait for a 'Spartacus'. This long-overdue correction of a massive resource misallocation may finally be upon us.

Related :

[The Education Disruption : 2015](#)

Related ATOM Chapters :

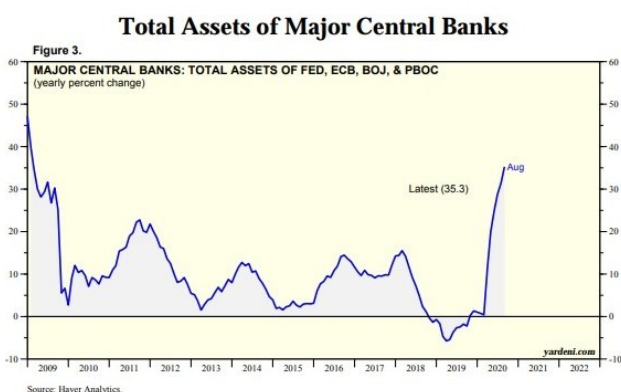
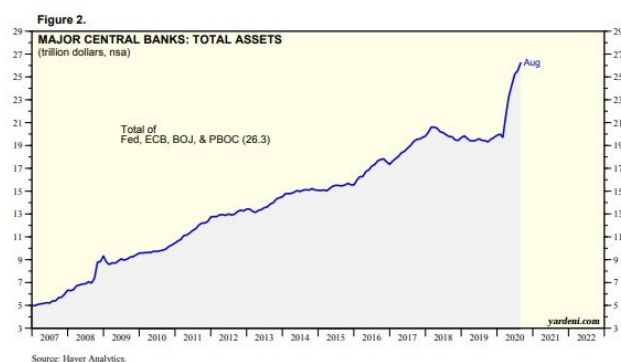
- [3. Technological Disruption is Pervasive and Deepening](#)
- [8. The ATOM Transformation by Sector](#)
- [9. Reframing 'Inequality'](#)

More ATOM Proof Piles Up

The Futurist · 17 September 2020 · Archived copy · Original

We are very near to being able to declare absolute victory on the **ATOM thesis**.

Remember that March 15, 2020 really was the '**Netscape Moment**' in Economics. The US Fed Funds rate, which was the only major rate in the world that was foolishly high at that point, went from 1.5% down to 0% (permanently), and trillions in new monetary creation commenced. As of August, the four major central banks are at +35.3% on a year-over-year basis ([source : Yardeni](#)).



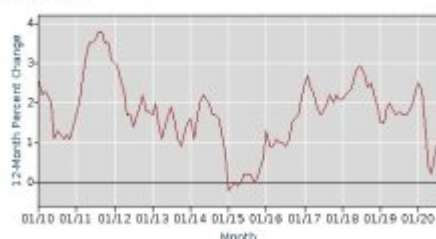
Meanwhile, the US 10-yr Treasury Note languishes at 0.7% yield, the weighted average yield of all high-grade 10-yr Sovereign Bonds worldwide is at approximately 0.00%, and oil remains below \$40/barrel even now, while the tech-laden Nasdaq 100 continues to make new all-time highs. **What more proof is required**, that monetary creation a) does not cause inflation up to a pretty high annual rate of creation, and b) this creation finds its way into technology, to produce more technology?

Now, we get the benefit of probing were the ceiling of the monetary creation gradient might be. I have maintained in the ATOM publication that 16-24% was the optimal rate of increase (based on my own proprietary research about the depth of technological density and acceleration), with a lower number resulting in insufficient inflation and the higher number causing brief inflation. Now, we happen to see a 35.3% net YoY increase. This is well above the band I specified above, but it also follows a period of slack, which means the CAGR over the last several years is still well below the 24%/yr upper bound.

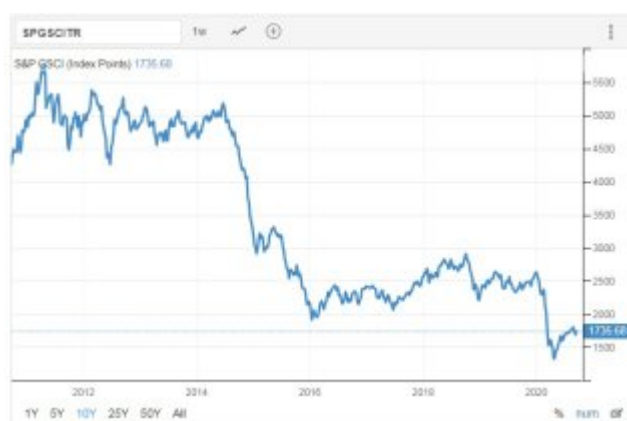
Data extracted on: September 17, 2020 (1:45:03 AM)

CPI for All Urban Consumers (CPI-U)

12-Month Percent Change



If the current YoY increase is in fact an overshoot above the optimal zone, there will be a very brief blip in the CPI. This will cause the disgruntled inflation hawks and PhD Economists to emerge from the woodwork to point out how 'the entire ATOM thesis is wrong'. They will be suitably embarrassed yet again, since the blip will be very brief once the trendline of 16-24% catches up. As we can see from the second chart, the CPI is just not having it.



Nor is the Goldman Sachs Commodity Index, which represents worldwide prices of all commodities (oil, gold, natural gas, silver, coffee, etc.). It is down a whopping 60% from its 2010 levels, despite all the QE. Even this index does not represent the accurate scale of commodity deflation, since I contend that computational power, storage, and bandwidth should all be commodities in this index (as volatility already is, despite not being a physical form). Inclusion of these components would reveal a faster as well as more accurate deflationary picture. This trend can only continue and accelerate through the 2020s and beyond.

Also note how large the base of cumulative monetary action now is. As we see from the chart, the YoY dollar amount is \$7 Trillion, and this is just for the four largest central banks (which amount to 85% of all monetary creation). Just to stay at 16% YoY growth for the next 365 days, another \$4.3 Trillion has to be done.

As I said in June :

I said elsewhere that the decade of the 2010s had \$23 Trillion of cumulative QE worldwide. The PhD Economists of the world, who have predicted 100 of the last zero bouts of hyperinflation, still believe QE is an aberration and assume that the cumulative QE will be reversed (i.e. that the 2020s will have -\$23 Trillion of cumulative QE). I claim the opposite, which is that under both ATOM principles and the Accelerating Rate of Change, the 2020s will see about \$100 Trillion of QE, **and** that this will move towards sending cash directly to people (rather than the esoteric bond-buying that comprises of QE today, which inevitably concentrates the benefit of this monetary creation in very few hands).

Does anyone doubt that the 2020s will in fact see \$100 Trillion of QE? The first eight months of 2020 are certainly on track for that trend. That means it is also on track for a greater diffusion of future monetary creation. The current channels are super-inefficient, super-saturated, and frankly, one could scarcely devise a better way for all new monetary creation to go just to the wealthiest tech billionaires while average people get nothing.

Furthermore, while bad governance can destroy anything (and this sort of new safety net actually increases the level of bad governance, as the penalties are delayed), the fact that the central banks of the world reacted so quickly means that a number negative economic phenomena might very well be in the past. For example :

- i) There may never be a traditional recession again, based on the technical definition of a recession, which is two consecutive quarters of negative 'Real' GDP.
- ii) There may never again be a stock market correction so severe that the S&P 500 remains over 10% below its all-time high for a full calendar year.
- iii) The S&P 500 may never again go more than three years without making an all-time high. Remember that dividends (about 1.7%/yr) also exist.

Points ii) and iii) above prove that the equity index, rather than gold, is the true safe haven. The gradient of progress in the modern era is just too steep for the multi-year recessions of the past to happen anymore barring the worst governance. The divergence between the performance of gold vs. that of the Nasdaq 100 over the last decade is extreme.

The proof is piling up. The Economics PhD ivory tower cannot continue their denial forever, as they already are in the dustbin of history. Yes, most recent articles here have been very similar, but remember that we are in the midst of a seminal historical turning point that almost no others have caught on to yet.



Update : For those worried about Money Supply, note that M1 has increased 42% YoY, and M2 about 24%. This is at a level where even I thought there could be inflation, since M1 is the most liquid and rapidly-circulated pool of money. Such inflation could happen, but has not happened yet.

If big increases in even M1 have not caused inflation (still TBD), then the case for ATOM-DUES is even stronger, as one of the last few unknowns has been exposed as a non-event.

Related ATOM Chapters :

2 : [The Exponential Trendline of Economic Growth](#)

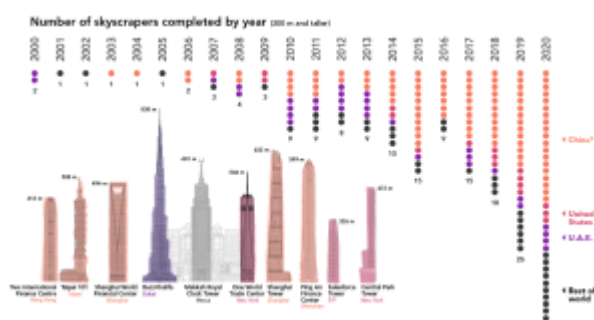
4 : [The Overlooked Economics of Technology](#)

ATOM Award of the Month, November 2020

The Futurist · 1 November 2020 · Archived copy · Original

As the lockdown has lasted longer than anyone thought, the third of the three coronavirus-related ATOM disruptions has continued to strengthen. As indicated in the [June 2020 ATOM AotM](#), the pandemic has made workers adapt to remote working, which dramatically reduces demand for office real estate, particularly in premium locations. This effect comes on top of the already underway glut of retail real estate that is discussed here often.

The market cap of Zoom has risen 5x to about \$150 Billion since May. This is an indicator of the expected volume of usage (whether this is the company that wins in the long run or not). This has immense implications for urban real estate. The exodus is already evident in rapidly rising vacancies and falling rents in the most expensive locations. If Pinterest, a company with only \$1 Billion in revenue, [decided to pay \\$90M \(one year's rent\) to terminate a 5-year lease](#), think of how many expiring leases are simply not being renewed (i.e. there is no cost to end them).



The most immediate effect is the sudden halt in many current construction projects, even if the costs are already sunk. Even if you just count skyscrapers taller than 150m in height, [there were 625 under construction worldwide before coronavirus](#). These were mostly in China, but 75 of them were in the US, including 41 in NYC alone. Many are [now on hold](#), but any buildings more than 20% complete have to be finished eventually. This is in addition to the huge volume of new skyscrapers completed in recent years (see image). To see charts of completion over time, [this website has a lot of data](#) (change city as needed).

It will take time for the capital to churn and repricing to manifest and stabilize, but the construction and permitting nexus is certain to do the worst possible thing, and halt all future construction in an attempt to constrict supply as well as obstruct the conversion of former office space into apartments. This will merely make the exodus more durable and irreversible.

The next question is one of how cityscapes adjust over the longer term. People often cannot think beyond binaries. Inane articles present just two choices, between the old fashioned structure of everyone commuting to an office every weekday and a system where 500 employees each work out of 500 homes at all times. Once the quarantine ends, the shift will be gradual. Five days a week in the office will become two or three. People can live twice as far away from home, which quadruples the amount of land area they can choose to live in, which, in turn, presents low-cost choices in most cases. The structural migration takes some time, as only renters are that fluid, but it nonetheless advances.

Residential real estate prices nearer to former job cores will fall, while those further away will stay the same. But the demand to convert excess office supply into residential supply will pressure prices further. This is ATOM deflation, but a problem for existing mortgageholders who are in a leveraged situation relative to their home equity. The Federal Reserve, of course, will print more money to keep up, but it will flow in directions the Federal Reserve did not predict. Hence, the cycle continues. As collaboration over videoconferencing becomes more normal, the distances that one can live from the main office rise. Eventually, some workers will be able to cross state lines and establish residency in low-tax states. The three places where workers are under the most onerous yoke of living

costs and taxes are Los Angeles, New York City, and worst of all, the San Francisco Bay Area.

The state of Pennsylvania has just a 3% state income tax, and parts of PA are just 75 miles from Manhattan. A commute from there to NYC was not viable under the 5-days-a-week model, but is under a 1-2 day model. The greater tri-state area never had to worry about the PA state line until now, but this corridor of capital exodus has begun, and portions of Eastern PA near Route 80 and other major highways connected to the tri-state area might just experience a fortuitous wave of incoming wealth.

But the tougher nut to crack is CA, particularly since the wealth creation in CA only began much more recently, and the state borders have thus become problematic far after they were drawn. While no two bordering states have a higher differential in income tax rates than CA and NV, CA never had to worry about this since the high-income people were all over 200 miles from the Nevada border, where the climate is far less pleasant. But as CA has increased its top income tax bracket from 9.3% in 2011 to what might become 16.3% soon, this rising delta combined with the Zoom revolution has begun to generate cracks in the dam. California's taxation greed has not taken into account how the ATOM adapts around such obstacles given that they want to levy a tax hike even as Zoom has decimated San Francisco's office rental market. As more Silicon Valley professionals cross into Nevada, the network effect manifests, and they help others settle there. There are already such resettlement cooperative groups in Reno, Incline Village, and the Las Vegas area.

Rents in San Francisco fall as much as 31%.

Hence, it is quite appropriate to compare the Bay Area's high costs and taxes **with OPEC's assumption that it could keep oil prices at \$110 or higher forever.** We know how that ended, and the same process could easily manifest over here, especially since it involves many of the people who are directly producing all the essential technological components of the ATOM. Expensive urban real estate, whether office, retail, or even residential, is a commodity. If it is made expensive due to artificial scarcity, then it falls under the might of the ATOM all the same.

Related ATOM Chapters :

4 : The Overlooked Economics of Technology

Comment of the Year - 2020

The Futurist · 11 December 2020 · Archived copy · Original

2020 was an unusual year by any standard. But it was the year **when many principles examined here, and in the ATOM publication, came to fruition**. \$8 Trillion of new monetary creation has not only not caused inflation, but the migration into disruptive technology companies. This is a tremendous confirmation of ATOM principles. More and more people are migrating towards recognition of these realities, but I remain the first, given the publication date of the **ATOM in early 2016**.

Blogs are a dying medium, at least to the extent that almost no blogs that were around when The Futurist first started (in early 2006) are still around now, unless it has become the author's full-time job, or it is a website with ten or more authors. To give you an idea, the narrow text column of this blog is a relic of how 4:3, rather than 16:9, was still the predominant aspect ratio in 2006. Widening the format retroactively messes up all the old articles, so I have not done it, leaving half of a 16:9 screen unused. The ATOM publication, given its later date, is a wider format for this reason.

Video seems to be a better medium, and I have to think about migrating over to there at some point. But that day is not today. Don't worry, I won't go away, even if the medium migrates.

The nature of this subject matter means that there are relatively few commenters (even if there are still several hundred visits per day, and over 50,000 per article). No other futurism blog, that deals with actual predictions rather than news, does much better either. One could lament that the importance of subjects we discuss here, and the extent to which they improve the human condition, deserve broader readership. That said, comments here maintain quality, rather than quantity.

Commenter Geoman has been a stalwart here for over a decade, and a comment he wrote very late in the year is actually the best comment of the year. He has discussed this idea many times, **but here is a comment that encapsulates it, and thus much of what we discuss here, completely** :

Hey Jenny,

Every problem can be reduced to energy, time, atoms, and information. And you can trade them off in various ways. Much of our engineering is just figuring out the best trade offs between the four components. And our access to information is increasing exponentially. And that means the inputs of time, atoms, and energy can be reduced - information takes their place. And information is getting cheaper.

That is the source of all technological deflation. Time passes at the same pace. Atoms - the number of atoms on Earth is not subject to change. I'm not sure energy costs have decreased. Nope, only information is increasing.

With fracking, we simply added a lot more information to the system. That reduced the time, energy, and atoms necessary to create the same output. I tell people all the time - fracking is OLD technology. We've been doing it for decades. Maybe a century. Horizontal drilling started in the 1980s. What changed was computers and sensors were able to guide the drill bits more precisely, with less people, AND we were able to more accurately model the impacts of fracking. We could see and understand what was happening in the subsurface. That meant the input of time, energy, and atoms could be vastly reduced. To a point where fracking became cheap and productive.

Look at oil - it is just time, information, energy and atoms. Oil in the ground is created using all of these things, but with very low information input, low energy, but LOTS of time. Millions of years. I could do the same thing with a nuclear reactor, sucking in air and water and creating synthetic oil, replacing the time with energy and information.

Look at SpaceX - tail landing rockets. That was proposed in the 1950s, but never done. Why? Because we

didn't have the sensors or computers to precisely control the rocket. We didn't until 2010 or so. It was always possible, but time, atoms and energy could not compensate for the lack of information. In fact the time input (millisecond precision) was fixed, and atoms and energy alone could not compensate. A higher information input was necessary.

Tall building can sway in the wind. To control sway, we built them bigger - using more atoms. But there are two other ways to reduce sway, better design (more information on how wind and tall structures interact) or active dampening systems (use information and energy to compensate). Both reduce the number of atoms necessary to control the problem.

There are hundreds of similar examples, once you start to think about them.

Each advance in human history was about changing the inputs. When humans discovered fire (input energy from wood), or when they finished the periodic table (input new atoms), or when they discovered how to use fossil fuels (input new energy), or society advanced rapidly. They could increase the input of energy and atoms. That reduced the necessary input of time. But now we have a fourth ingredient, information, replacing energy and matter. That fourth ingredient always existed, we were just largely unaware of it (how to make a fire, where to find the atoms, how to extract and refine oil). And for a huge section of human history, it didn't increase very much.

Now it is, and everything is being recalculated. Information gives us more atoms (say, finding new mineral deposits) and energy (say, better solar panels), and at the same time requires we need less of both. Information even compresses time - think of medicine, where, prior to very recently, new drugs were developed by trial and error. That required a huge input of time. With designer drugs (made possible with information), that time input can be reduced substantially.

That is something every adult should internalize, as a broader understanding of everything can flow from these 'first principles'. All sorts of ignorant misconceptions and bad predictions ('peak oil', 'QE causes inflation', 'banning this technology will save X industry', etc.) can be dismissed just based on these principles alone.

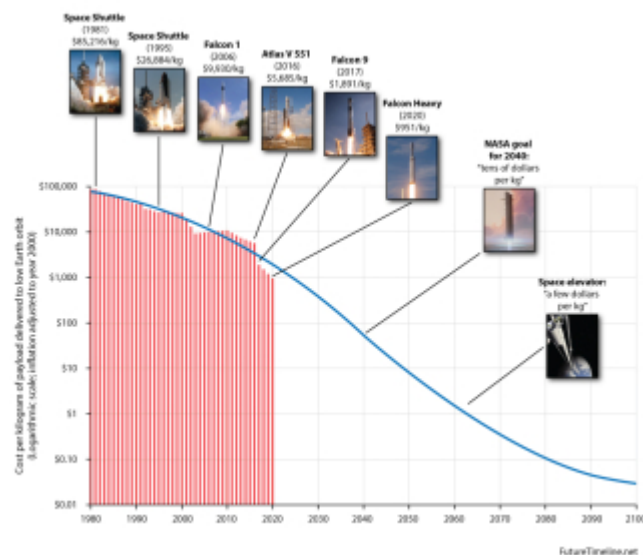
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[Comment of the Year - 2019](#)

ATOM Award of the Month, January 2021

The Futurist · 10 January 2021 · Archived copy · Original

It is time for another **ATOM AotM**. This one, in particular, goes retro and ties into concepts from the early days of The Futurist, back in 2006. This award also dispels the misinformed myth that 'we can no longer send a man to the Moon like we did in 1969-72' or, even worse, that 'human progress peaked in 1969'. If anything, progress in space-related advancement has been steadily on an exponential trendline.

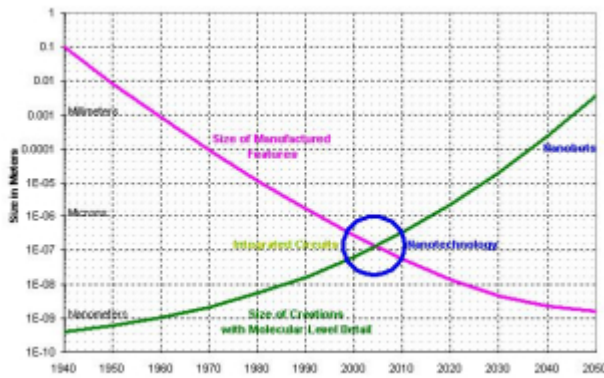


The first man-made object to be placed into orbit and send back information from orbit, was Sputnik in 1957. Since that time, satellites have risen in number and complexity. But the primary cost of a satellite is not the hardware itself, but rather the cost of getting it to orbit in the first place. While the early data is sparse and the trendline was not easy to discern, we are now in an inflection point of this trajectory, enabling a variety of entities far smaller than governments to launch objects into orbit. If the trendline of a 10x reduction per decade is in fact manifested, then a number of entirely new industries will emerge in short order.

The emergence of private enterprises that can create profitable businesses from space is an aspect of the 21st century that is entirely different from the capital-intensive government space programs of the second half of the 20th century. From geospatial data to satellite-derived high-speed Internet, the era of commercial space is here.

SpaceX has already begun the Starlink program, which advertises 1 Gbps Internet access for rural customers. It is not yet apparent how SpaceX will upgrade the hardware of its satellites over time, but if the 1 Gbps speed is a reality, this will break the cartel of existing land-based ISPs (such as Comcast), where the gross margin they earn on existing customers is as high as 97%. Needless to say, high-speed access available to the backwaters of the world will boost their economic productivity.

Other efficiencies are on the horizon. 3D Printing in space is very pragmatic, as only the 3D Printing filament has to be replenished from Earth, and finished objects are simply printed in orbit. As the filament never has an awkward shape, it is far less expensive to send unprinted filament into an orbiting 3D printer. Asteroid mining is another, and is an extension of the fundamental ATOM principle of technology always increasing the supply of, or alternatives to, any commodity. The prices of precious metals on Earth could collapse when asteroid mining reaches fruition, to a much greater extent than oil prices plunged from hydraulic fracturing.



But the falling cost of launch per unit weight is only half of the story. To see the second exponential, we go all the way back to an article from April 22, 2006, titled '**Milli, Micro, Nano, Pico**'. The point here is that the ability to engineer smaller and smaller (integrated circuits with 5 nm transistors), at greater and greater scale, comprise a double exponential of technological intricacy and integration. Surely, this has to result in a modernization of the electronics sent up into space.

Consider that the major unmanned spacecraft that NASA has launched, such as the Pioneer, Voyager, and Cassini probes. These were electronics from the 1970s, with designs that are not being updated to this day given that the New Horizons probe (launched in 2006) was still the same size. We know that an electronics design, from 1975 to 2020, is expected to shrink in both size and cost by a factor of over 1 million. If a supercomputer the size of an entire room in 1975 is less powerful than a 200-gram Raspberry Pi system in 2021, then why is NASA still launching one-ton devices that have incorporated none of the advances in electronics that have happened in the last 45 years? The camera and transmitter on Voyager 2 are surely far less powerful than what exists in 2021 smartphones.

Given the continued shrinkage in electronics and decline in launch costs, it is long past time for thousands of Voyager-type probes, each the size of a smartphone, to be launched in all directions. Every significant body in the Solar System should have a probe around it taking pictures and other readings, and the number of images available on the Internet should be hundreds of times greater than exists now. This will happen once someone with the appropriate capabilities notices how far behind the electronics of NASA and other space agencies are.

Hence, this ATOM AotM makes use of up to three exponential trends at once. But the decline in launch costs per unit weight alone has immense implications.

This will be the final **ATOM AotM** posted on this website as an article. Future instances will be on my new YouTube channel, which I hope to inaugurate in February.

Related ATOM Chapters :

3. Technological Disruption is Pervasive and Deepening

12. The ATOM's Effect on the Final Frontier

Endings and Reincarnations

The Futurist · 24 January 2021 · Archived copy · Original

Today is exactly **15 years** after the start of this website. Since that time, just about every blog that was active then, has been discontinued, unless it is the blogger's full-time career now. On top of that, futurism is a very exclusive niche, as surprisingly few people are curious about the future beyond superficial information. However, the **accelerating rate of change**, and ever-growing size and power of the ATOM, mean that the trends we discuss here are appearing in more mainstream topics. Among the many technological changes since then, that was an era of 4:3 screens instead of 16:9, and of blogging rather than social media (let alone video-based social media). Even converting this website to 16:9 messed up the old articles, and when faced with a choice of reformatting all of them manually, or leaving them as is as a relic of their time, I chose the latter. Note that the more recent **ATOM publication** is 16:9.

A lot has come and gone in the elapsed 15 years. Consider the case of Singularity University. It began in 2009 on the reputation of Ray Kurzweil, who at the time was easily the most high-profile Futurist in the world, with a respectable track record of predictions. However, detached from Kurzweil's direct involvement, the institution quickly migrated away from any actual futurism, and built itself around a model of low-tech, in-person learning, where a single one-week program costs \$15,000 (which is even more expensive than nearby Stanford University). **A few famous critiques outline how that operation practices virtually none of what it preaches**, and even this was before a **spate of scandals** did **further damage** to its reputation.

Hence, there is now a vacuum in this niche, even though the rate of change continues to rise, which naturally means more organic demand for futurism. Furthermore, if the ATOM has enabled a medium that is more flexible, far reaching, and monetized to reach full maturity, it would be appropriate for me to produce content there, under simple ATOM principles (again, in contrast to Singularity University, which is in fact the whole point of embodying one's futurism). High-traffic YouTubers have an income stream that is very ATOM-efficient in terms of taxes, location independence, affiliate marketing, and network effects among YouTubers. This, combined with the structural decline in the university model of learning, as we often discuss here, makes the window of opportunity obvious.

I believe I have the material here, as well as through my experience teaching at Stanford University and speaking at large conferences worldwide, to singlehandedly create the premier YouTube channel devoted to this subject. Over the recent holiday period, I just brainstormed a list of video topics for which I already have 10-20 minutes of tight content in my head, and the list quickly grew to over 300 titles. The list is a superset of what is written here, since there will be more current, mainstream topics interspersed along the way. On YouTube, all existing content is either very simple and caters to average people, or is just a recording of an esoteric talk at a conference, and not made for YouTube. The chasm in between is unpopulated. The YouTube channel has a better chance of being synergistic with my other professional activities, which this website was not able to rise to, traffic-wise.

This is one of those things where I am surprised and bit annoyed that this did not occur to me years sooner. When this website began, I was 32, whereas now I am 47. While YouTube wasn't established in 2006, suffice it to say that for video purposes, a 32-year-old is always going to be more telegenic than a 47-year-old. Or at least I should have begun in 2015 when I was writing the ATOM publication, or in early 2016 when I posted it. Then again, almost all of the best instructional videos on YouTube about how to undertake each aspect of creating a channel all seem to have been posted in the last 12 months, and I might not have thought it was easy to do, until recently. It is definitely not too late, certainly for this niche.

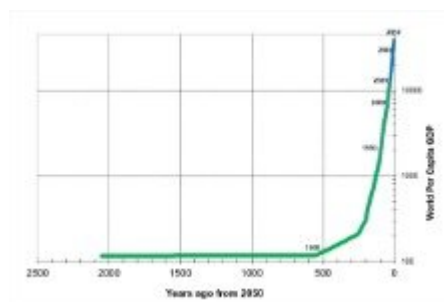
My goals for the channel are simple. Among those are that I would like to eventually reach 300,000 subscribers, and 1 million hours of cumulative view time. There will be little traffic until after the first 100 videos are posted, after which traffic rises exponentially. I will have to put in over a thousand hours of work, and \$4000+ in sunk costs before seeing anything, but as this replaces many other activities, including a lot of to-and-from transit,

perhaps the net is less.

The other factor is the greater 'immortality' of video. Since we expect a **Technological Singularity in about ~41 years (give or take)**, a large body of video has a greater chance of still being watched by people around at that time, even if I am gone, and even if Google/YouTube is not the platform then. I absolutely think it is essential that people at that time know who the early leaders in this subject were.

I still have to learn the first thing about editing videos, which is necessary even for hiring other editors, but I am to begin uploading videos in February.

The future of this website will be determined at a later date. To keep comments active, Typepad charges \$60/yr, which is trivial, but I have to see how relevant this website remains in relation to the YouTube channel. The high-quality, page-length comments that some contribute are more suitable here than on YouTube.



Let's see what happens. I hope all readers over here migrate to the channel when I post the details of it.

Until that time, see you in the future!

YouTube Channel Underway

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For readers of this website, the YouTube channel is now underway. Remember that at first, YouTube is about churning out videos with an emphasis on quantity rather than quality, as is the advice of almost every high-traffic YouTube channel, even for business-related topics. Hence, the initial quality is not going to be that high. Over time, the quality will rise as traffic begins to emerge.

But I would like to invite all long-term readers here to subscribe to the channel, view the videos, upvote them, and comment. If you want to unsubscribe later after there are more new subscribers, no worries. The 2021 videos are distinct from the old, grainy videos from before the channel was being built.

The channel is here :

<https://www.youtube.com/channel/UCuRX67CJhaOT98Jdjh85CEQ/featured>