

The Future of Everything

Part 1

Title borrowed from a Wall Street Journal Magazine
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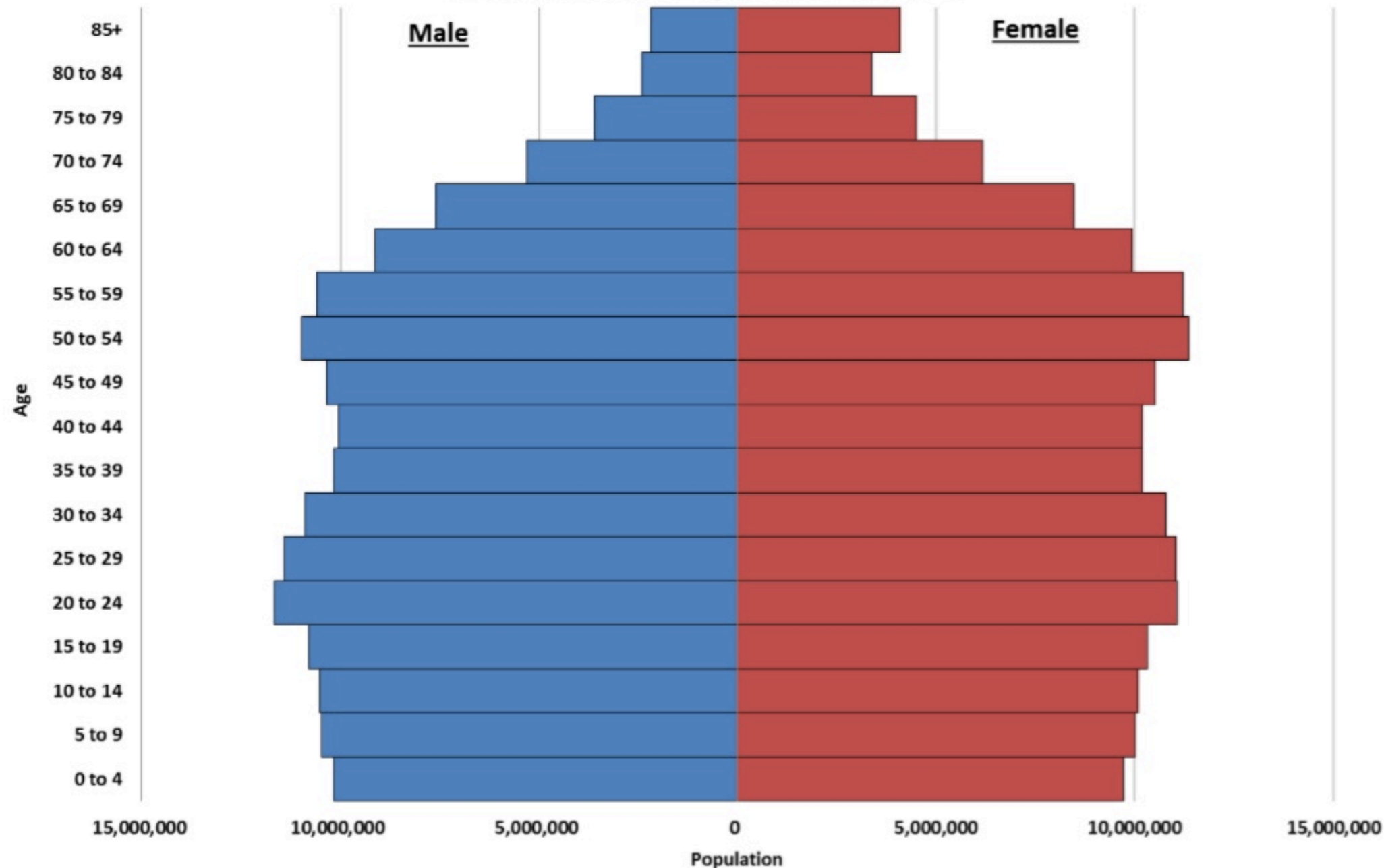
The Future

- No one can really predict the future
- Let's speculate on a few promising threads
- Demographic threads of
future growth
will capitalism survive?
- Some promising technology ideas
artificial intelligence
future of work
new medical ideas
future of poverty

Future Demographics

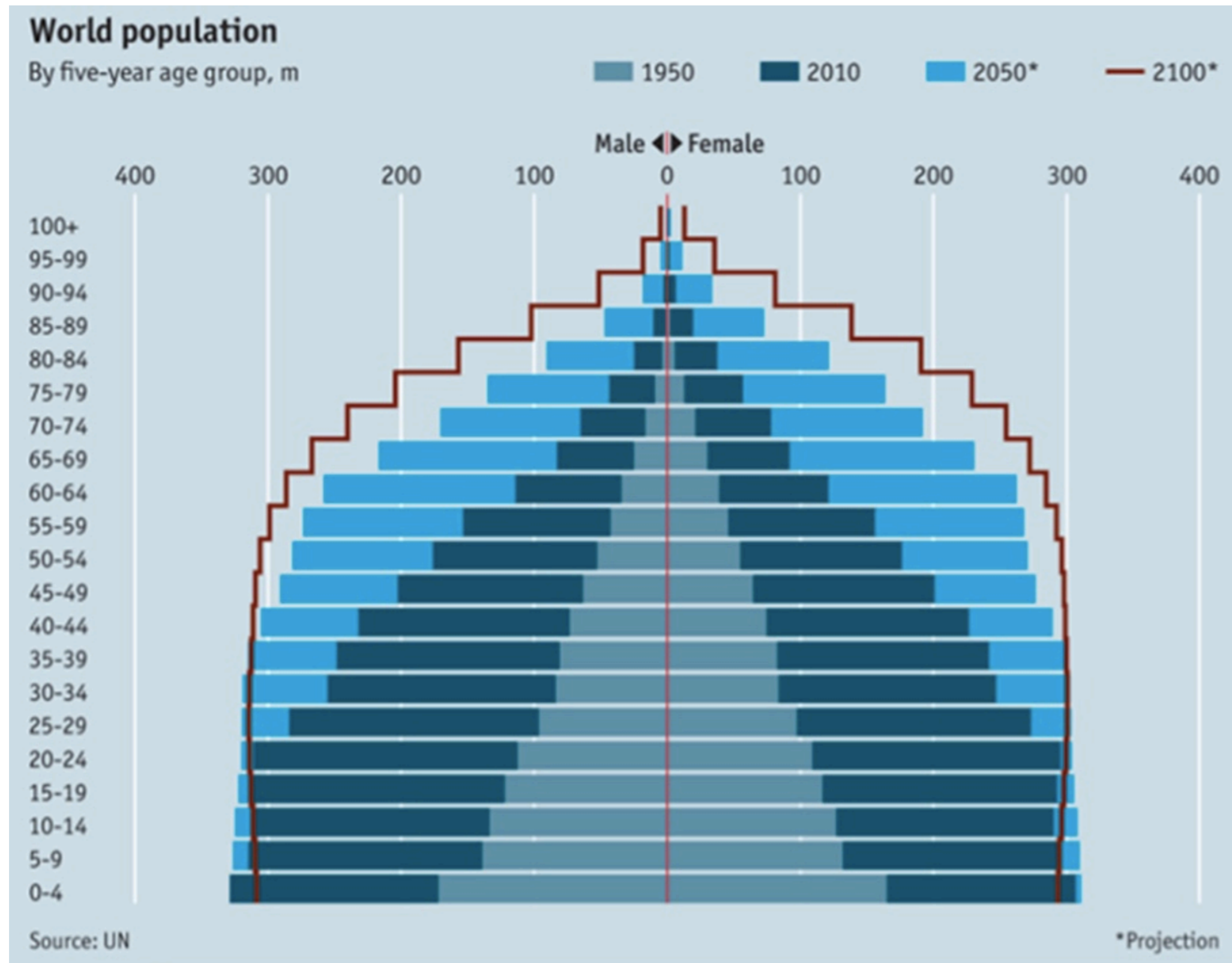
In the US true pyramids were found in the mid 20th Century while modern ones are more like trapezoids. Younger populations through their 60s are about equal in this 2015 graph.

**Chart 1: Population Pyramid of the U.S.
Total Resident Population in 2015**



Source: U.S. Census Bureau, Vintage 2015 Population Estimates.

World Population 1950-2100



General Population Information

- Population guesses beyond a 50 year horizon are usually not very good
- A few simple behavior and economic changes can drastically change outcomes
- The 4 horsemen of the apocalypse (death, famine, disease, and war) may also drastically influence the outcome
- Africa is the center of much of the growth in the next 80 years
- If the African middle class grows and the poor class shrinks in the next 30 years this projected population increase will need to be revised down

Growth in Broad Terms

- Demographic winter is when there is a lack of enough births in a population to stabilize the population much less reach replacement levels
- There is some fear that our national identities will be lost by this demographic winter in our own populations and exacerbated by unbridled immigration
- Economic and population growth have been the norm from the beginning of the human race
- Can we continue to grow in the future with limited goods and resources (energy and labor force)
- See my presentation on Stuff if you are worried about this (even if populations reach 12 billion in 2100)

Growth in Broad Terms (Cont)

- Paradoxically if we continue to develop our economies, lift large portions of our poor out of poverty and expand our middle class we could easily find ourselves in 2100 with only about 9 billion people
- This might put us into a situation where growth on all fronts - population, economic systems, resources, labor force, consumers and a variety of other segments has completely stopped
- There is a question about whether human society can survive in the face of these types of changes
- Lets explore some possibilities of future technology and social developments before we come to any conclusions on a non-growth scenario (discussed in Part 2)

“The Future of Everything” - a WSJ Magazine

Published November/December 2017

- On the cover is a Google microchip with Quantum Leap written across it
- “Encryption.Medicine.Artificial Intelligence”
- “How Google’s new chip could change the world - if it works” (now that’s encouraging!)
- But if we want to try to look into the future we have to accept uncertainty
- Articles range far and wide
 - taking the liver destroying properties out of alcohol while keeping the “buzz”
 - transforming “ecstasy” into a therapy for PTSD
 - the death of retail at the mall
 - making AI safe for human use

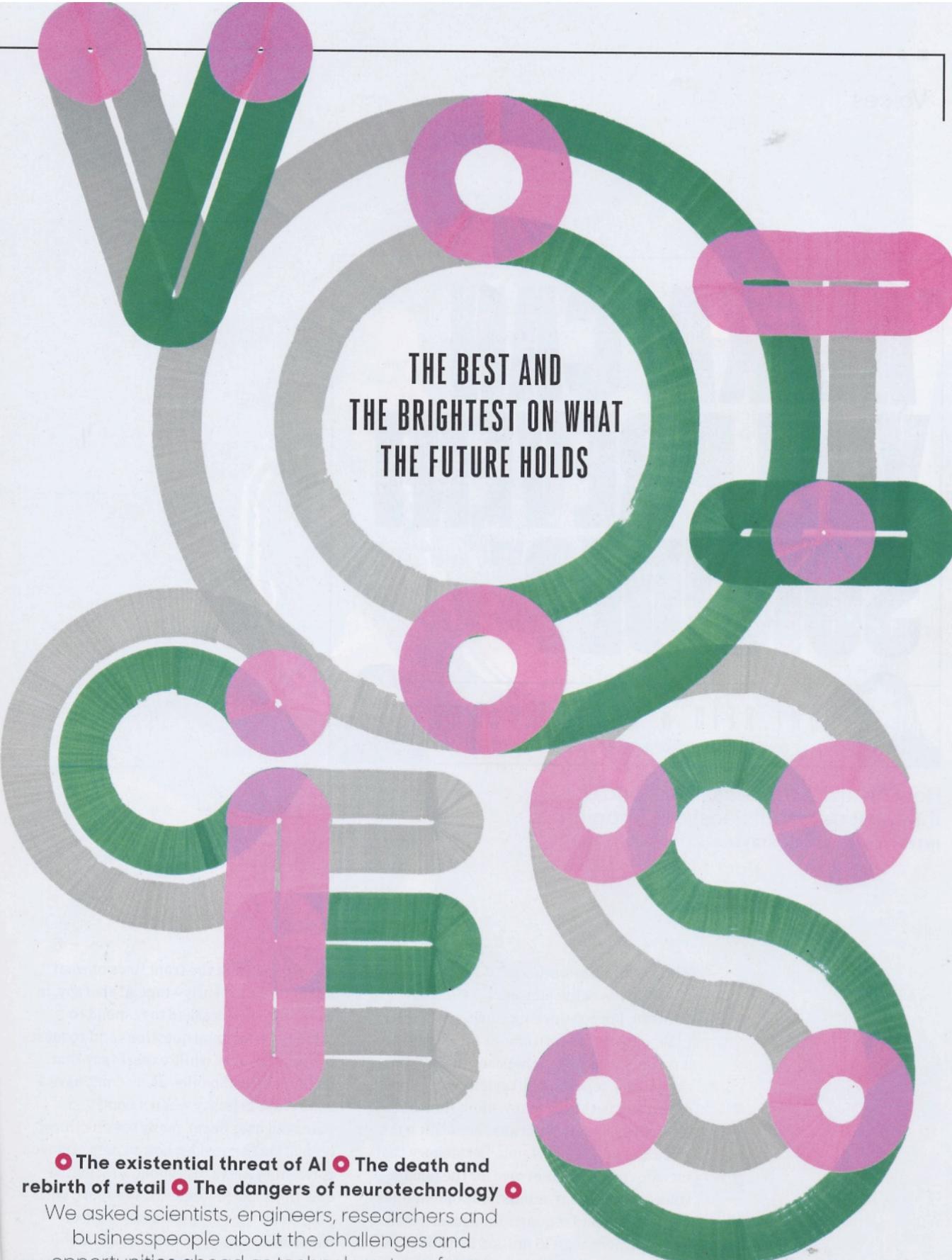
More on The Future of Everything

- I have a copy if anyone is interested (time permits only a brief look at the many subjects discussed)



Technology - Computers - Future

- Quantum computers that can reliably utilize “superposition” (atoms can exist in two states at once and two locations at the same time) will have almost unimaginable power
- One concrete action that a quantum computer that would be of interest to many of us would be to instantly crack any sort of encryption
- There is a verification issue due to the high error rates that present systems exhibit
- The computing power of these machines will revolutionize almost every aspect of our lives



THE BEST AND
THE BRIGHTEST ON WHAT
THE FUTURE HOLDS

● The existential threat of AI ● The death and
rebirth of retail ● The dangers of neurotechnology ●

We asked scientists, engineers, researchers and
businesspeople about the challenges and
opportunities ahead as technology transforms
every industry and aspect of life.

Lettering by DAVE TOWERS

Artificial Intelligence

- AI in machines like IBM's Watson is beginning to give us power to begin to explore very complex processes
- Computers have now beat expert humans in complex types of games such as Chess, Go and others
- The ability to “mine” information with these quick and specialized algorithm driven machines is now allowing non human devices to support legal and medical processes so that the results outperform human experts

Driverless Transportation

- Once this system is perfected and fully tested and starts to be used, it will affect how we view personal automobile ownership, over the road shipment of goods and the many other processes that are involved with this industry
- Road safety, insurance, energy use, traffic control and so on are expected to change significantly
- All aspects of car, truck and bus road transport will be affected (there will likely be a serious work force shrinkage)
- More efficient computer aided routing will cut traffic congestion and accidents

Robots and Human Assistance in Japan

- An aging population is causing the Japanese to explore robots as companions and helpers for old people
- A shrinking of the 1-15 year age group as well as the work age population and a growing gray haired group is squeezing the elder care system
- In most cities in Japan there is a growing number of abandoned houses after the older owners die and there are no children to deal with them or the children are living and working far from these places
- Municipal tax authorities are beginning to struggle with the issue of a shrinking tax base

Japan Real Estate

- Population in Japan is expected to drop from the present level of 128 million to 107 million in 2050
- 40% of Japan's population will be over 65 in 2050
- Only the very clever real estate brokers will survive this kind of market
- Even business real estate will be doubly challenged by this aging of the population as well as technology fundamentally changing the business real estate market

The exoskeleton story

- Many interesting robots and human assisted systems are now being designed and built in Japan
- One real and useful exoskeleton product is now being used by a 68 year old man who works for a small construction company in Japan
- He is the only employee in the warehouse where trucks are loaded early each day with equipment and materials for the jobs that day
- His exoskeleton made from light strong metal and driven by electrical and hydraulic actuators allow him to do the work of several young muscular guys

Bjorn Lomborg's Poverty Solution

“Low Cost of Ending Poverty” April 2017

- His recent report shows us some possibilities for getting rid of one of our most pressing of world problems.
- There are presently about 700 million people in extreme poverty in the world
- About 2.7 billion people live in unhealthy conditions with indoor smoke that is equivalent to smoking 2 packs of cigarettes a day
- The health risks and medical cost of this larger poor population and extreme poverty of the smaller group and a population bloom of both of them is a cause for concern for all of us

Poverty Solution (continued)

- Third world poverty is defined as making less than \$1.90/day
- This 700 million group of people makes up 9.4% of global population
- This figure was stuck in the low teens until recently and it is remarkable that it has reached a value of less than 1 in 10
- In 1820 nine out of ten people were at this level of equivalent poverty and by 1920 about 65% of the world population were still at this level of poverty

Two Example Countries of Extreme Poverty

- India has the biggest group in the world that presently live in extreme poverty
- The total population of this group of poor people is 268 million strong
- These individuals on average are 38 cents below the \$1.90 line which totals \$11 billion/year.
- The Democratic Republic of Congo (DRC) has 77% of its population in very extreme poverty
- They are on average about \$1 under the daily poverty line and will require \$12 billion a year to bring them all out of poverty
- These two countries are at the global extreme and this value of \$23 billion is about 1/3 of all the funds needed to raise the threshold of the global poor each year

Possible Solution - a calculation

- Accounting for lack of or no data for North Korea, Yemen and Zimbabwe a good estimate of world poverty figures has recently been made
- The amount of money to bring the world's poor out of poverty (at the \$1.90/day level) is thought to be about \$75 billion a year (as of 2015)
- Contrast this figure with the annual budget for world development aid which is \$140 billion

And if we do nothing?

- There have already been large improvements as can be seen in this presentation
- In fact by 2030, without any additional support beyond present development plans the global poor will have dropped to 400 million (in just about 12 years)
- And by 2060 poverty at the \$1.90/day level (inflated to 2060 values) will no longer exist

What would it take?

- To eradicate global poverty today the developed world could supply funds to a special account with a one time donation of \$1 trillion dollars (considering interest)
- Over the next 40+ years starting today, all the poor populations of the world would have a minimum per capita income of \$1.90/day until funds are no longer needed
- To put \$1 trillion in perspective it is 1% of global annual GDP or 1/20 of the US national debt
- \$1 trillion is only one year of the cost that the Paris climate agreement requires of the signatories to rein in CO₂ emissions in order to drop global temperature in 2100 by 0.17 degrees C (how crazy is that? - the poverty deal looks much better to me and it is only a one time expense)

Lomborg's Final Comments

- Basic economic growth is by far the best way to raise the global poor out of poverty and an added bonus is that more economically well off people have less children
- A good example of this sort of economic miracle is the fact that China over the past 30 years has lifted 680 million of its people out of extreme poverty
- China is now considering removing the “1 child only” ban due to an impending demographic winter
- Demographic winter is a threat of population rate dramatically falling far below replacement rates
- There is often a steep curve involved with this phenomenon (in this case a steep downward trend)

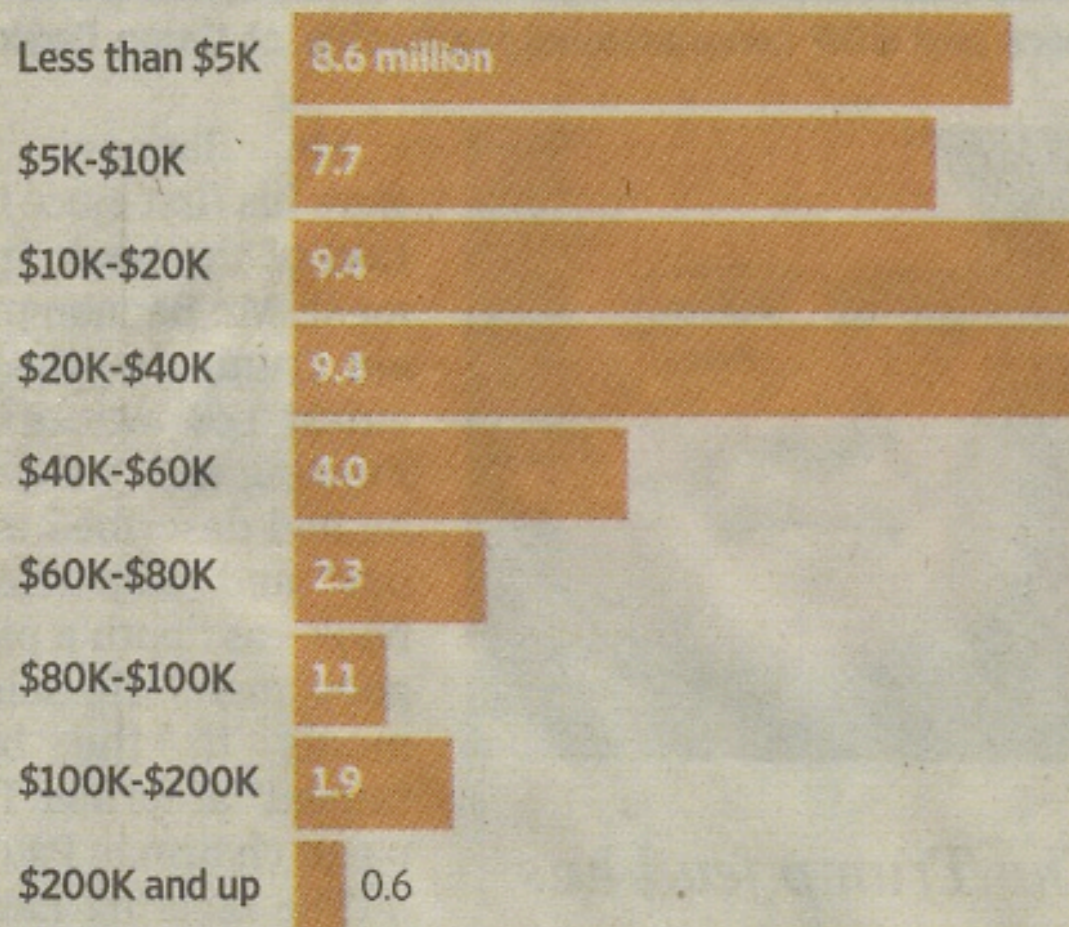
Present Trends in Education

- There are some unsettling activities occurring in the US educational system
- Both in K-12 and the university levels
- None of it looks much like the schools that I went to
- The issue is that those who fail to look into the past are likely doomed to repeat failures found there
- And those who don't study the data and hold fast to scientific principles will probably resort to magic and accomplish very little

Some Present Data on US University Students (reported in WSJ)

Borrow

Most student-loan borrowers have outstanding balances below \$20,000. Federal student loans, by number of borrowers, fourth quarter of 2017:



Study

Top 10 majors for undergraduates enrolled at four-year institutions for fall 2017:



- The stats and comments for the condition of our present system is all I will discuss today and they may be alarming for some of us
- I may be able to speculate on what the future may bring in Part 2
- 40% of the roughly 17.5 million undergraduate college students today attend two-year colleges
- About 32% are part-time students who are not necessarily straight out of high school
- Only about 25% of all students are on an educational path that looked like mine when I started at NMSU in 1961

Educational Issues

- Quality and Quantity
- Costs and Debt
- These have skyrocketed for some students exacerbating problems at the beginning of a hopefully successful career
- Does the educational system really prepare our children for a career in the real world?
- What are the emerging careers going to be in the future?
- Will the system be able to prepare students for these careers?
- I will try to look briefly at these issues in Part 2

Overall Issues

- The future is murky and perhaps scary
- How will we deal with the future and the choices that we will have to make?
- By a steady stream of opinions and through the contentious political process?
- Or by looking into the future and obtaining the best information we can and through discussion and debate resolve the issues?
- Can we approach the future with ethics, honor and for some of us a belief in religious principles?
- Or do we slip back into the Dark Ages and the burning of witches?

Conclusion

- This is part 1
- Part 2 will have more details on some of the areas that were only briefly covered here
- A whole discussion of zero or negative growth systems will be covered in Part 2
- There are some emerging and very interesting technologies and ideas that may or may not be found in our future
- Bitcoin and blockchain concepts are in the news - I will try to briefly discuss these ideas in Part 2