The Next Big Thing We Won't Be Able to Live Without? Fulbright's Half-Life Theory Gives Us Some Ideas

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Abstract

My great-grandparents lived one-half of their lives without electricity. My grandparents lived one-half of their lives without a telephone. My parents lived one-half of their lives without a television. My sister has lived one-half of her life without a computer and I have lived one-half of my life without Google. Today, we could not imagine life without these must-have technologies. With the current college student being about 20 years old, we ask ourselves what must-have technology will this generation live one-half of their lives without? Whatever it is currently is in research labs, will probably be an early product in the 2020-2025 time frame, and become a life-changing technology in 2030-2040. It will change the way we live, work, recreate, and will make billions of dollars. But, it won't be anything we know and love and use today. What are some of the possibilities? This subject yields wonderful in-class discussion in any college-level course and gives students a different way to perceive their place in history.

Introduction

Since the beginning of the industrial revolution, each generation has witnessed the advent and mass adoption of technologies we now view as indispensable to our daily lives. At some point in their lives the "must-have" technology was not available. The technology then became available as early, primitive, products and then some time later became adopted by most people with everyone using it since. For every must-have technology we use today we can identify a generation that lived roughly half of their lives without it. For this discussion, we assume a person lives 80 years making the midpoint of one's life around age 40. Current college students are about 20 years in age, so have about 20 years to go before reaching their "half-life" point. Can we imagine what technology is likely to be the hot, in-demand thing 20 years from now and make some predictions about what the next must-have thing is going to be?

This line of thinking evolved from an off-hand comment made during the teaching of a systematic innovation class when the author realized none of the students in the class had ever lived without a cell phone. After expanding on the idea, the topic has been a routine lecture topic in several different courses and the subject of more than one workshop-style discussions at conferences and other meetings. The subject has proven interesting to students and motivates in-class discussion and fits in any college-level class.

The Technological Lifecycle

All technologies go through a lifecycle. At some point they are just ideas or new scientific discoveries, then research projects, then new products, then mainstream products. The lifecycle of a technology is commonly represented by the classic S-curve. The consulting firm Gartner has produced a number of S-curve models for different domains called "Hype Cycles." [1]. The Gartner Technology Hype Cycle is shown in Figure 1. Note especially the "ramp up" period of time required to go from technology trigger to the peak.

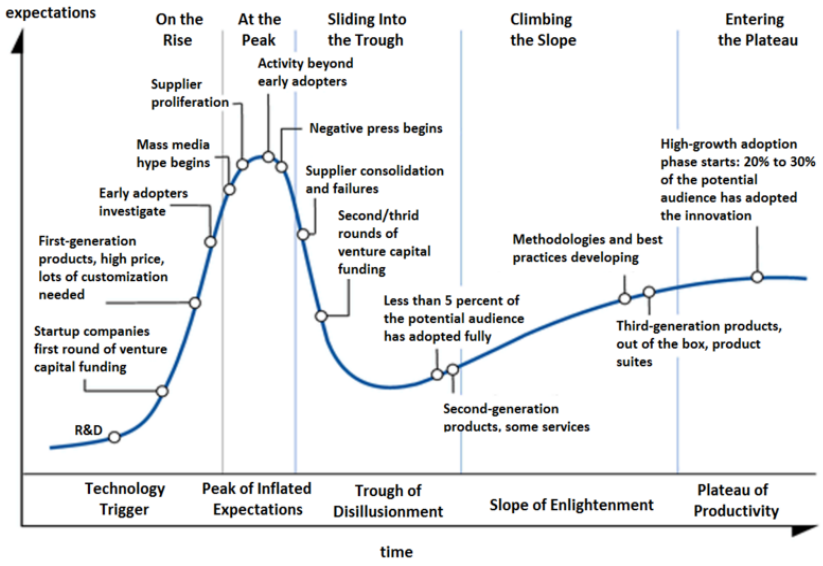

Figure 1 The Gartner Technology Hype Cycle

Rate of Technology Adoption

Technology is being adopted faster over the last 100 years as shown in Figure 2. Since the 1950s, 20-30 years are required from scientific discoveries to reach must-have technology status. There are two major reasons for the lag. First, new discoveries are made with, and in, lab-scale equipment and environments and time is required to mature the technology. Second, technological advances seldom thrive in isolation. Instead, an entire ecosystem of supporting and complementary technologies must emerge to make the "new" technology a game changer. For example, Facebook, originated in 2004, could not happen until Web technologies (Web pages) had been created over ten years earlier. Web technologies required the Internet, invented 25 years prior. None of the above would be as important as they are without personal computers arising 20-25 years before Facebook.

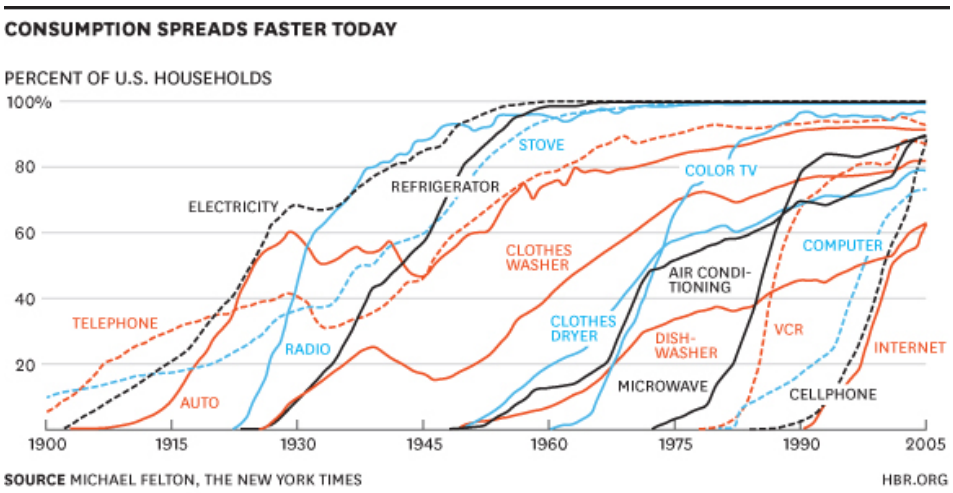

Figure 2 – Adoption Rates of Key Technologies of the 20th Century

Half-Life Theory

Typical college-age students have about 20 years to go to reach their half-life point and it takes at least 20 years for must-have technologies to reach mass-market status. So "the next big thing" is just a research topic currently. This means nothing we are currently familiar with, including Facebook, Google, YouTube, Wikipedia, smartphones, and the Internet will be "the next big thing" (though they will likely play a part). Listed are a few emerging technologies that might generate the must-have technology for the college-age generation.

Personalized medicine and healthcare
In 20 years, we may hardly ever physically go to a doctor's office and we will receive medication and treatments personally designed for us and our specific ailment. The bodies of subsequent generations will be continuously monitored and illness diagnosed and treated even before symptoms appear.

Cognitive augmentation/Big Data
IBM Watson won Jeopardy 4 years ago and is growing up. Future generations will never know a life without deep-reasoning knowledge-processing apps, systems, and appliances augmenting everyday life.

3D printing
3D printers exist now, but they are primitive compared to what they will be in the must-have stage. 3D printing will evolve to be more like the replicators in Star Trek.

Telepresence, holograms, VR glasses
Pictures are worth a thousand words and a video is worth a million pictures. Immersive 3D virtual and augmented reality is worth the future. Imagine a billion people "attending" the World Cup final by putting on a future version of Oculus Rift gear and feeling as though they are right there in the stadium.

Flexible electronics/plastic electronics
Carrying our electronics around in bulky, hard cases will one day look like the hook-and-cradle telephone of the

1920s. Think flexible, credit card sized phones and computers expandable to full-size by stretching and combining with other units while costing only pennies. Computing will become embedded into life.

Artificial body parts
Artificial feet, legs, arms, and hearts are progressing today and will continue to evolve but soon will be joined by artificial organs such as: pancreas, liver, lungs, kidneys, stomach, ears and eyes. Future generations will think of us as living in the Stone Age because we die of failed organs they just get replaced.

"Doclets"
Related to "plastic electronics" above, imagine paper-sheet-sized displays/tablets you can place across your desk to handle multiple documents by *actually physically handling the document.*

UAVs
The near future will see the pervasive use of unmanned aerial vehicles for monitoring, sensing, police work, delivery, etc. Today's drones are like horse drawn wagons in comparison.

Automated vehicles
Driverless vehicles for freight, public transportation and new age, intelligent, "cruise control" for personal vehicles. Future generations will wonder why we wanted to actually drive a vehicle ourselves.

Digital friends, assistants, counselors
People will develop relationships with artificial cognitive entities (call them "cogs") possessing rich and varied personalities and deep-reasoning skills.

Device-less communication
Just talk, ambient computing technology delivers the message –no devices needed.

Quantum computing
Computers solving currently intractable problems, millions of times faster will lead to new kinds of Big Data analysis and redefine what is computable.

Nanotechnology
Molecular-sized engineering will affect nearly every area of technology including several listed here.

References

[1] "Research Methodologies: Gartner Hype Cycle," Gartner Internet Web site located at http://www.gartner.com/technology/research/methodologies/hype-cycle.jsp and last accessed February 2015.