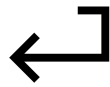


Emerging Opportunities

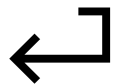
Agenda

1. Anticipating Change
2. Biotechnology
3. Green Technology
4. Authentic Living
5. Ethics & Technology
6. Summary

Anticipating Change



Johannes Gutenberg invented the printing press. His introduction of mechanical movable type printing to Europe started the Printing Revolution and is widely regarded as the most important invention of the second millennium, the seminal event which ushered in the modern period of human history. It played a key role in the development of the Renaissance, Reformation, the Age of Enlightenment, and the scientific revolution and laid the material basis for the modern knowledge-based economy and the spread of learning to the masses. U.S. librarian of Congress Carla Hayden describes the printing press as history's most important innovation because it allowed literacy to spread and thinkers to share ideas and, thus, invent more things.



Alternate Summary:

Quantum Computing:

- Not here yet
- Likely wont be useful for a few years
- Will have very specialised applications
- Wont replace normal computers

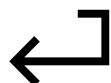
Machine Learning:

“now matches or exceeds the ability of experts in medicine and other fields to interpret what they see”

- Only in very limited domains
- Has as many failures as successes
- Requires expert humans to make to work

Blockchain

- Still has to connect to the “real”
- Can be hacked
- Quantum computing may destroy it



Biotechnology

Luby learned that Procter & Gamble, the consumer product conglomerate, was eager to prove the value of its new antibacterial Safeguard Soap. Once a week, field-workers from HOPE fanned out through twenty-five randomly chosen neighbourhoods in the Karachi slums distributing the soap, some with the antibacterial agent and some without. They encouraged people to use it in six situations: to wash their bodies once daily and to wash their hands every time they defecated, wiped an infant, or were about to eat, prepare food, or feed it to others.

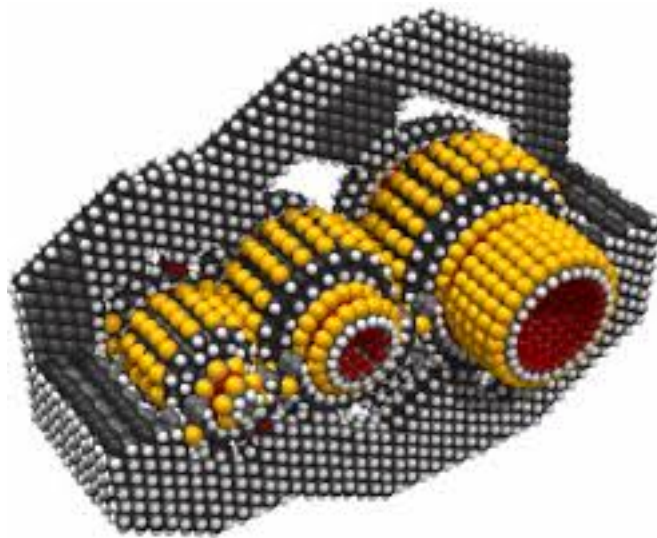
The field-workers then collected information on illness rates among children in the test neighbourhoods, as well as in eleven control neighbourhoods, where no soap was distributed. Families in the test neighbourhoods received an average of 3.3 bars of soap per week for one year.

During this period, the incidence of diarrhea among children in these neighbourhoods fell 52 percent compared to that in the control group, no matter which soap was used. The incidence of pneumonia fell 48 percent. And the incidence of impetigo, a bacterial skin infection, fell 35 percent.

The key specific understanding is the opportunity for technology to vastly improve people's quality of lives, particularly people living in developing countries.

Nanotechnology means lots of things, manipulating stuff at the nanometer size.

- Material science advances (eg paints)
- The original definition by Drexler : rebadged as **Nano synthesis**
- Building things from atoms - eg diamond atoms
- Very hard to do, due to the physical forces at atomic scales



- Biotech
- Using a pre-built molecular machines - that come from nature (eg George Church & Synthetic Biology).

Green Technology

Despite DuPont offering to double Norman's salary, he left the company to head the newly established Cooperative Wheat Research and Production Program in Mexico. There he developed semi-dwarf, highyield, disease-resistant wheat varieties.

During the mid-20th century, Norman led the introduction of these high-yielding varieties combined with modern agricultural production techniques to Mexico, Pakistan, and India. As a result, Mexico became a net exporter of wheat by 1963. Between 1965 and 1970, wheat yields nearly doubled in Pakistan and India, greatly improving the food security in those nations.

Norman is often called "the father of the Green Revolution", and is credited with saving over a billion people worldwide from starvation.

The key specific understanding is the importance of green technology and the extraordinary impact and handful of innovations can have on the world's population.

Authentic Living

Ethics & Technology Topics

- Statistical and machine learning biases (Google searches)
- Keeping humans in the loop (decisions should be made by humans)
- Concentration of power in the few (Eg Facebook, Google)
- National or Global wellbeing vs market driven (Eg outsourced but dehumanised workers)
- Job losses (at some point we might become the horse)
- Technology saviours (AGI or politics)

Summary

- The Fourth Industrial Revolution is a range of new technologies that are meshing the physical, digital and biological worlds, and impacting all disciplines, economies and industries
- Examples:
 - Internet of Things
 - Quantum Computing
 - Machine Learning
 - Blockchain
- Nanotechnology is manipulation of matter on an atomic, molecular, and supramolecular scale
- Recent technological breakthroughs that have come from the field of biotechnology include:
 - DNA Reprogramming
 - Human Cell Atlas
 - Liquid Biopsies
 - Organs on a Chip

- An emerging business opportunity for entrepreneurs that may come from advances in biotechnology is the development of **wearable** devices that monitor cellular level activity in the human body.
- As the world's population grows, farmers will need to produce more and more food. Yet arable acreage cannot keep pace. The looming food security threat could easily devolve into regional or even global instability
- Recent technological breakthroughs that have come from the field of green tech include:
 - Precision Farming
 - Artificial Photosynthesis o Green vehicles
- Philanthropy is the desire to promote the welfare of others, expressed especially by the generous donation of money to good causes
- Philanthropic pursuits enable successful business people to help others and seek authentic wealth