

What characterizes exponential technology change and does it differ from past patterns of technology change?

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Introduction

- 1st Industrial Revolution used water & steam power to mechanize production
- 2nd Industrial Revolution used electric power to create mass production
- 3rd Industrial Revolution used electronics and IT to automate production (digital revolution)
- 4th Industrial Revolution builds on the digital revolution
- 5th IR?

What do we mean by technological change? Does it mean the same to different people and disciplines?

Pace

- To answer this question correctly depends on whether we are referring to i) basic information generation/knowledge production or ii) innovation (application of that knowledge for social/economic impact)
 - In the case of the former, then the answer is faster and perhaps more complex, as a result of the exponential trend and convergence/fusion of various technologies
 - In the case of the latter, the answer is no for those technological applications that have governance related challenges (e.g. genetic engineering applications have not been used extensively despite many years of Research & D)
- Cavet – this answer may differ for different economies & different applications as well as different contexts:
 - Moore's Law - Maybe we can position the different technologies and fused hybrids at the "S" shaped curve continuum?
 - Can they stabilize like in the case of 1st & 2nd industrial revolutions?

Scope

- There is no limit - Scope is within what human can do (skills/capabilities, resources, supportive enabling ecosystem etc)
- Characterised by blending of technologies that is blurring the lines between physical, digital and biological spheres
- Technologies tend to encourage open-source, which may arguably facilitate access by a large number of people and diffusion
- Enhanced networking, collaboration and relationship building across different levels and scales

Impact

- Can be phenomenal or catastrophic
 - Depends on place of i) values and ii) availability and implementation of systems for technological management and governance
- Possible positive transformation in human progress (social/economic/environment)
 - Increased innovation opportunities and economic activities.
 - Think of innovations in health; better crops & animals; energy; environmental management etc
 - Think of robots, unmanned driving technologies and other applications that can enhance productivity & efficiency at different levels
 - Increased opportunities for youth in the ICT sector (seen in Kenya for instance)

Impact

Negative – potential to cause a catastrophic setback

- Think of misuse of biological innovations for e.g. terrorism
- Think of possible increased unemployment - jobs losses (e.g. due to use of robots etc)
- The need for economies to develop infrastructural required to keep pace with the unprecedented trend (human capital, structural changes, governance structures etc).
- Demand side versus supply side (re-alignment etc)
 - Are new policies (trade, import regulation, IPRs, procurement, etc) required?

Impact

The future looks promising but the question is:

- How do we reach there?
- How do we take or bring everybody along?
- How can we overcome the handles along the way?
- Many questions that need answers...

Thank you!