

The Impact of Exponential Technical Change and Automation in Society: Jobs and Equalities among Countries

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Presentation outline

- Introduction: examples of exponential technical change and automation
- Impacts on Jobs
- Impacts on equalities among nations
- Concluding remarks and recommendations.

Introduction: Exponential technical change and automation

- Exponential technical change and automation technologies are already with us: examples
 - Miniaturization and doubling of computer processing speed every 2 years is a typical exponential growth of technology in IT sector
 - The computer that started with the size of a room can now be in our pockets.
 - On the other hand Automation technologies are technologies that replace human cognitive, physical, and social capabilities with machines and computers to get work done. Good example is advanced robotics and artificial intelligence.

Impacts on Jobs

- There are two schools of thoughts: jobs destruction/remain the same or increase.
- While there little focus in literature on issues of jobs loss and how; a lot has been written on net job creation
 - Schumpeter's theory of creative destruction
 - that new technology destroys old companies along with old jobs
 - But in the process create even more companies and better jobs (paradigm shift)
 - Over time observation is that societies that allow creative destruction to operate grow more productive and richer, with high living standards.
 - Good example is industrial revolution where agricultural jobs were destroyed by creating much more through industrialization and associated services: banking, logistics, trade, business services, etc.

Impacts on Jobs cont..

- Studies has been carried out ever since and the same has been observed; e.g. in transportation creative destruction is an ongoing process: starting with steam power that came with railroads, creating much more jobs.
- Haltiwanger and Schuh (1996) studied job flows in the US manufacturing, and observed that over ten per cent of the jobs that exist at any point in time did not exist a year before or will not exist a year later.
- That is, over ten per cent of existing jobs are destroyed each year and about the same amount are created within the same year.
- Following this study, many others were carried in other countries, with more or less the same conclusion.
- **Conclude: no impact or positive, in the North.**

Impacts on Jobs cont..

- The dynamo in the creative destruction is entrepreneurship and free market.
 - Entrepreneurs introduce new products and technologies because of profit gain.
 - Later on others will copy, and entrepreneurs have to re-innovate again to maintain super profit, setting the Schumpeterian motor in motion.
- While, exponential technical change and automation will have little negative effects on jobs and the welfare of the society in developed countries, it potentially has a very negative impact on poor countries; and produce inequality among nations.

Impacts on equality among nations

- Inequality comes from the fact that poor countries will be exporting jobs rather than products and services.
 - Ever Cheap and high quality products – because of automation technologies - from developed countries will flood the markets in poor countries.
 - Poor countries do not have capabilities for these technologies and therefore products produced in these countries will be of low quality and production processes more costly.
 - The net result is products of low quality and expensive that cannot compete with imported products.
 - Already happening even in low tech sectors such as food processing; Tz for instance import cooking oil by 70%

Impacts on equality among nations cont..

- This is despite the fact that there are oil seeds farmers and processors who could have benefited if all the oil could be produced locally, even exporting some, generating more employment.
- In other words, exponential technological change in manufacturing is also affecting the agricultural sector that cannot develop in isolation to the manufacturing sector.
- In theory, poor countries needs to catch up technologically with rich countries; however, the catch up that is already a major problem, will even be made more difficult by exponential technical change

Impacts on equality among nations cont..

- The rapid rate of technological innovation in the industrialized countries will reduce the time that mature technologies stay on the market
- Issues on technology cross over (integration) will also limit the process of catch up: technologies which previously relied entirely on mechanical parts now contain microelectronic components.
- adoption and reverse engineer of these technologies will be limited by knowledge on micro-electronics.
- Since learning is a process, there is limited time to learn and adopt technologies before they disappear in the market.
- This will keep on widening the technology gap, making catching up even more difficult.

Impacts on Inequality among nations cont..

- This will exacerbate the poverty situation in poor countries - as the difference between the rich and poor is based in the difference in capabilities to produce and market internationally competitive products and services.
- The situation can be different in ICT; the existing evidence indicate that exponential growth in ICT is actually benefiting all nations almost equally.
- For poor countries ICT has enabled access to services that were hitherto not available to some section of the society, e.g. the rural people with banking facilities.
- Easy flow of information have enabled farmers to know daily prices of their produce, even in far cities.
- Quality education for free: Massive Open Online Courses

Concluding remarks and recommendations.

- Set a Schumpeterian motor in motion in Africa
 - Training on entrepreneurship; especially technology entrepreneurship
 - Build capability of the national innovation system – international tech transfer and catch up pre-supposes this.
 - Capability building in policy making: STI policy expertise in poor countries is a major and basic problem.
 - There is also a need to rethink international trade policies; poor countries to take a more protectionism stance in their industrial policies (more research on this issue)

Concluding remarks and recommendations cont...

- In South Korea, for example, engineering firms took nearly 20 years to emerge from industrial infancy and to compete in international markets without needing extensive protection.
- Rich countries to allow a certain quarter of imports from poor countries (to learn by exporting) – while assisting them to catch up technologically.
- Work on issues of technology transfer: what are the best modalities (FDI, or direct technology transfer, e.g. through licensing or imports of machinery, etc
- Address the issue of TRIPS.
- Address the issue of power imbalance in international negotiations: international cooperation will be difficult in the absence of this