

Chapter 1

Doing More With Less: The Impact of New Technologies on Labor Markets, Economy, and Society

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ABSTRACT

Technological advances and novel applications in areas such as industrial robots (eventually personal robotics), artificial intelligence, big data, 3D printing, the internet of things, biotechnology, blockchain, and others have revived the debate on how the development and implementation of technological innovations may displace labor. These technologies are allowing the innovation of products, services, and business models at unprecedented speed, in the same way they are putting at risk both qualified and unqualified jobs and occupations. Most of the specialized literature dealing with the issue of technology and labor comes from the economics discipline, but it is pertinent to discuss how this translates into the managerial, organizational, and strategic principles framed for the fourth industrial revolution.

INTRODUCTION

The impact of technology and innovation on labor markets has been a recurring theme of study for economist and social scientists since the Luddite movement in England when it opposed the integration of the spinning jenny to yarn production, however the impact of modern technologies is beyond jobs, it also reaches into business models and the organization structure itself. Keynes (1930) in the short essay Economic Possibilities for our Grandchildren, mentioned how the increases in efficiency in the different production processes would result in the replacement of labor by capital, thus creating technological unemployment.

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Technology is allowing businesses to create more value using less resources, startups that turn eventually into “unicorns” or corporations that reach valuations of billions of dollars that employ people in the dozens or maybe hundreds versus the corporate behemoths of past times that employed people by the hundreds of thousands. Nowadays companies large and small can leverage key resources, outsource processes or automate as necessary to remain competitive and profitable.

Steijn (2017) attests that contemporary society is currently reaping the benefits of decades of investment and cumulative innovation in information technology and telecommunications. Technological advances and novel applications in areas such as industrial robots (eventually personal robotics), artificial intelligence, big data, 3D printing, the IoT, biotechnology, blockchain and others, have revived the debate on how the development and implementation of technological innovations may displace labor (Silva & Lima, 2017).

These technologies are allowing the innovation of products, services and business models at unprecedented speed, in the same way they are putting at risk both qualified and unqualified jobs and occupations (Manyika et al., 2013; Ford, 2015; Pratt, 2015 Sachs, 2015). Additionally, the emergence of what has been called digital economy, gig economy, economy on demand or collaborative economy has demonstrated a major shift in human resources management. The growth of digital platforms and peer-to-peer marketplaces (eg AirBnB, Amazon Flex, Amazon Mechanical Turk, Cabify, Deliveroo, Etsy, Lyft, Rappi, TaskRabbit, Uber, etc.) brings great advantages in efficiency in the use of resources and flexibility in working time, but it also raises questions if whether this model is considered decent work, whether it provides income stability and raises questions on the issue of social security benefits for workers under these new business models (OECD, 2016; ILO, 2016a; ILO, 2016b).

Brynjolfsson and McAfee (2014) argued that modern society has reached a second machine age. The first age automated muscular work freeing labor from the agricultural sector, leading to the manufacturing and service sectors that employ the bulk of the population. The second machine age would automate complex work and tasks, which until recently, was the exclusive domain of humans.

There are several factors that can influence the labor market, among these, the relative supply of skilled and unskilled labor, market liberalization, offshoring and outsourcing of production, globalization and global value chains, the decrease in the participation of workers in unions, changes in fiscal policy, among other aspects (Autor, 2015). However, in the most recent literature, the impact of ICT takes center stage.

This chapter aims to discuss how the creation and diffusion innovations are transforming business models, creating new products and services, empowering consumers, streamlining value chains and changing the organizational structure of corporations big and small, startups, even local and national governments.

SCHUMPETERIAN CREATIVE DESTRUCTION

Decades of cumulative public and private investment in the development of technologies like mainframes, transistors, processors, the internet, GPS¹, voice and facial recognition, material science and sensors, to name some, have permitted the incubation and development and commercialization of incremental and disruptive innovations (then products and services) that are shaping contemporary society.

In the 1990s the focus of attention shifted towards the impact of ICT. Aronowitz and Di Fazio (1995) and Rifkin (1995) presented a grim scenario for workers in the face of changes brought by the diminishing costs and the rapid diffusion of the aforementioned technologies. However, Handel (2003) rebutted

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