

Chapter 12

Information Systems Governance and Industry 4.0: People as a Central Link

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ABSTRACT

The information society requires governance. The complexity of the markets is bringing complexity to the functioning of economic organizations. The pressure of technological innovation challenges the need for governance on organizational systems, in particular on information systems. But the role of technological innovation is pressing for the re-qualification and re-balance of jobs and professions themselves. This process has come to assert itself as a result of the affirmation of Industry 4.0, where, evidently, technologies accelerate the replacement of human presence in the production system.

INTRODUCTION

The challenges of Information Systems Governance are, in most cases, transversal to different natures of organizations and sectors of activities. The business processes, common to any other organization, and particularly in industrial organizations, are characterized by the presence of specific production processes where industrial control systems take over, along with the business processes present in any other organization, a decisive impact on its governance.

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In this sense, we can assume that the organization and industrial functioning constitute two indissoluble realities. The productive processes support, in an increasingly visible way, the factors of competitive differentiation, in that they must have the capacity to process massive amounts of data in increasingly short periods, from frequently distinct and unstructured sources. The recent trend towards one-size-fits-all production has been forcing. The transition from mass production to a more personalized one, supported by a set of technologies that provide a growing autonomy, requires differentiated strategies according to the specificity of market segments and a greater capacity for monitoring and inclusion of the most innovative technologies associated with their operation.

What we have generally agreed to call Industry 4.0 is currently a complex web of «communicating vessels» where numerous suppliers, physical flows of raw materials, subsidiary materials, energy resources and computing capacity converge for the execution of materials transformation processes in products. It is in this networked model, which underlies a process of transformation from a traditionally physical to digital environment, that SI governance emerges in most economic organizations, regardless of the sector, and that allows to anticipate the existence of particularities associated with IS governance in industrial organizations.

Information Systems Governance in industrial organizations has had a limited application when it comes to infrastructure planning and productivity increases in factories. However, recent technological innovations in the industrial field have highlighted the need for a more holistic approach to the traditional management of industrial units. Technologies such as Cyber-Physical systems (CPS), Internet of Things (Iot), Cloud Computing, among others, provide new opportunities and dynamics in the industrial field, even having opened the opportunity to classify a new phase of development in this sector called the 4th industrial revolution (Santos *et al.*, 2018). Industry 4.0 marks a new paradigm in economic history. Industry 4.0 promises to bring traditional industry into the era of artificial intelligence, where digital technologies will be an integral part of industrial production processes (Horváth, 2018). More stakeholders, more resources, more technologies, more technical and scientific interdisciplinarity will be realities associated with this new paradigm.

In this context, industrial competitiveness is now conditioned, from an internal perspective, by the availability and allocation of resources to investment, and, from an external perspective, by the ability to respond to time-to-market, among other examples, among other aspects. This new performance framework associated with technological innovation tends to significantly alter the traditional status quo with the polarization of production processes around automation and evolution to a “proto-cognitive” capacity at the factory level.

Even making projections only with current technology and its expected evolution, the transformation will have a very diverse range between geographies and sectors of activity, merging what is now distinct, changing combinations and opening deep cleavages in what is now continuous.

New paradigms of collaboration between people and machines/software, which are perspective, will be catalysts of the design of innovative infrastructures and the relationship between the parts of an Organization, and between organizations, requiring negotiation of new commitments, read, a new Governance, where high technology (IT) will function as a building block elementary.

While the current debate has highlighted the potential of a social crisis, resulting from unemployment generated by increasing automation, and relegated to secondary plan the challenge of population aging, the exclusion of people with limitations, the inability to integrate refugees and the scarcity of people able to meet the new challenges of companies in the more developed economies, the essence of the discussion of this theme, should take into account the opportunity to address the ethical dramas of

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