

Governing industrial organizations through cognitive machines

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Abstract Recently, researchers on organization theory and behavior were challenged by the introduction of cognitive machines in the list of the organization's participants. Researchers in this field advocated that cognitive machines contribute to improve cognitive abilities in the organization by extending people's rationality and decision-making capacity and by reducing intra-individual and group dysfunctional conflicts. This paper supports these findings and extends their results to upper layers at managerial and organizational levels of application by proposing the concept of new industrial organizations with structure and processes of Computational Organization Management Networks. In such a new organization type, cognitive machines and cognitive information systems are prominent actors of governance, automation, and control of the whole enterprise.

Keywords Customer-Centric Organizations · Industrial organizations · Organizational cognition · Cognitive machines · Immersiveness · Computational Organizational Management Networks

1 Introduction

This paper mainly relies on principles of incompatibility existing between the continuous growth in the level of environmental complexity and the insufficient cognitive

capacity of the organization to deal with higher levels of environmental uncertainty, to attend new market demands, to manage shareholders' interests and customers' satisfaction and relationship, and to capture effectively information resources from the environment. Such a premise has been debated by researchers and motivated industrial organizations to pursue higher degrees of cognition, intelligence, autonomy, learning, and knowledge management, to develop new core competencies, and to extend the organization' participants rationality to more advanced models of cognition through the design of cognitive machines in organizations (Nobre et al. 2009a, b, 2010).

This paper focuses on the general picture of organizations pursuing high degrees of cognition in order to improve their capabilities of information processing, knowledge, and uncertainty management. It assumes that improvements in the degree of organizational cognition can lead the organization to achieve higher degrees of flexibility (Toni and Tonchia 1998) and agility (Lee 1998), to operate through higher levels of mass customization (Pine 1999), to manage greater levels of environmental uncertainty, and to provide customers with immersiveness (Nobre 2011c; Nobre and Walker 2011a, b).

This research supports the existing works on manufacturing systems and industrial organizations (Kusiak 2000; Monfared and Steiner 1997; Rao et al. 1993), and additionally, it extends past and present concepts by proposing new technological, managerial, and organizational capabilities that have to be developed in order to satisfy the requirements and to configure the new industrial organization in the twenty-first century. First and foremost, this work aims to give insights and answers to the questions in the following whose responses are blended over this paper: (1) What are the features of a new industrial organization?

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