Chapter 14

Critical Success Factors in the Transition Processes to Industry 4.0 Projects

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ABSTRACT

In today’s competitive industrial world, sustainability and competitive advantage of companies depend mostly on their capability of adaptation to changing business requirements. The Fourth Industrial Revolution, driving from the progress in new technologies has been profoundly changing the dynamics of most industries. Hence, companies are getting prepared to move from the Third Industrial Revolution to the Fourth Industrial Revolution. The purpose of this research is to define critical success factors in the transition processes to Industry 4.0 projects. It is important for the effectiveness of the transition process to Industry 4.0. In this study, a literature study was conducted to identify the critical success factors in the transition processes of Industry 4.0. and, the survey instrument, a questionnaire form, was designed. The results of this research show that big data management is the most important success factor of Industry 4.0.

INTRODUCTION

The world has become different as fast as it has ever existed since the First Industrial Revolution. In recent years, Industry 4.0 has become popular as a result of searching methods to control operations more effectively. As a result, companies are getting prepared to move from the Third Industrial Revolution to the Fourth Industrial Revolution. Determination of the factors affecting the success of companies in this transition process and realizing the effects of these factors have become the major interest for researchers in terms of the effectiveness of the transition process to Industry 4.0.

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Industry 4.0, which was first announced in 2011 at the Hannover Fair in Germany, has been a topic of constant consideration since then by academics, practitioners, politicians and government officials around the world. Kagermann et al. (2013) has defined the Industry 4.0 concept as a new trend in automation and data transfer in production technology encompassing cyber physical systems (CPS), the Internet of things (IOT), cloud systems, and the concept of smart factory. To summarize the system briefly; the digital copy of real objects is created in virtual world with the help of the pyramid physical systems created in the established smart factories. With the internet of objects, products are coordinated in communication with each other and with people (Sung, 2018). Industry 4.0 will reduce the responsibility of enterprises to adapt to new business trends. Issues such as sudden demand increases in the market, short-lived products, complex product structures, and supply chains that exceed the country borders are the trends putting pressure on enterprises.

Implementing Industry 4.0 systems is a complex, lengthy, and expensive process. As a result critical success factors in the transition processes to industry 4.0 projects become very important for companies. The aim of this study is first of all to identify the critical success factors of the Industry 4.0. Furthermore, perception of Industry 4.0 has been investigated in this research. First, a literature review was carried out to determine perception of Industry 4.0 and the critical success factors in the processes of the firms located in Turkey. The second section in this chapter presents relevant literature, research framework, and the hypotheses of the research. The third section provides research methodology, results, and findings. Finally, the last section provides conclusions.

LITERATURE REVIEW

Industry 4.0

Oesterreich and Teuteberg (2016) and Herman et al. (2016) emphasized inadequacy of academic studies about Industry 4.0. According to more than 2000 companies, digitalization levels of companies are increasing rapidly. At the end of this transformation process, it can be said that all successful industrial companies will be digital companies. This digitality can be explained as the products will be both physically and virtually visible and contain innovative services. At the same time, digitized enterprises will work in harmony with digital ecosystems, including the common technologies they have established with their customers and suppliers (Tupa et al., 2017).

According to a study conducting by McKinsey in 2015, companies are not able to continuously know new emerging technologies. McKinsey conducted a survey of 300 leading companies in manufacturing. According to results, 48 percent of these companies are ready for Industry 4.0, and 78 percent of participating companies stated that they are in preparation for this new process (Sung, 2018). As a result, critical success factors of the Industry 4.0 projects is very important for firms.

Industry 4.0 refers to new technological improvements where the internet and other technologies such as embedded systems are defined as the main characters of Industry 4.0. They provide the integration of physical objects, labours, intelligent machines, production lines and processes, and also create a new model of intelligent, internet connected and agile value chain. (Leyh et al., 2017). Industry 4.0 is the digital copies of real objects that are created in virtual world with the help of cyber physical systems in the smart factories. With the internet of things, products will be in communication with each other and with labour. Also, products and labour will be well coordinated. Thus, production and process monitoring...
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