Chapter 9
Industry 4.0 and the Internet of Things (IoT)

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ABSTRACT

In this study, the periodical differences of industrial revolutions, which is one of the effects of technological developments in the industrial field, and the last stage of it are mentioned. With the latest industrial revolution called Industry 4.0, machines work in harmony with technology at every stage of industrial areas. This period, known as Industry 4.0 or the fourth industrial revolution, refers to the system in which the latest production technologies, automation systems, and the technologies that make up this system exchange data with each other. In addition to the information technologies and automation systems used in Industry 3.0, industrial production has gained a whole new dimension with the use of the internet. With internet networks, machines, operators, and robots now work in harmony. At this point, the concept of internet of objects becomes important. Therefore, another focus of the study is the concept of internet of objects. There are some assumptions about the uses, benefits, and future status of the internet of things.

INTRODUCTION

Industry 4.0 refers to the use of the latest developments in today's technologies in the industrial areas. Before examining this period, also called 4. industrial revolution, it is useful to examine the process of industrial revolutions to the present day.In the first industrial revolution that started in the 1700s, the production of steam machine and the use of weaving machines increased. During this period, small workshops turned into large factories where machines were used. This transformation is the first development of machinery to replace manpower(Dombrowsi & Wagner, 2014). By the 1800s, the further development of technology led to the second industrial revolution. The use of electricity in production has led to the creation of production lines and the transition to mass production (Tunzelmann, 2003). In the second industrial revolution, the development of transportation networks is of great importance.

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Developing transport networks have increased access to remote markets and facilitated the acquisition of new raw materials. In this period, rather than steam power, the use of electricity in the production process facilitated the transition to mass production.

Significant advances in digital technologies in the 1900s paved the way for the third industrial revolution. The use of information and communication technologies in the production process has caused manpower to be replaced by machines. Computer technologies and communication technologies are revolutionary not only in production but also in all areas of life. The establishment of an inter-computer network system for military intelligence in the 1960s is considered as the first example of the Internet. In the United States, an intercomputer network system called ARPANET was developed. Subsequent developments, the first IP addresses have been identified. With the introduction of computer systems and the use of the Internet, technological developments have become inevitable.

The aim of this study is to examine the latest industrial revolution, industry 4.0, to examine the dimensions reached by the technologies used in industry 4.0, and to reveal the importance of the Internet of Things concept in the 4th Industrial Revolution. According to this study, productivity and profitability can be increased in the industrial field with the internet of objects and other developing technologies. As in the basic philosophy of society 5.0 mentioned in the last part of the study; simple tasks can be done by robots so that individuals can concentrate on more complex tasks requiring higher intelligence.

The rest of this research is organized as follows. In the second part, literature review is given. Chapter 3 describes the technologies used in industry 4.0, the definition of the Internet of Things, one of the components of industry 4.0, their uses, the benefits of their applications, and the possible negative consequences. Section 4 aims to introduce a new concept, Society 5.0. Finally, there is a conclusion section.

BACKGROUND

The concept of the 4th Industrial Revolution was first used in 2011 at the Hannover Fair in Germany (EBSO, 2015). Industry 4.0 generally consists of three structures: The Internet of Things, The Internet of Services and The Cyber Physical Systems. The concept of Industry 4.0 can be defined as modular structured smart factories, monitoring with cyber-physical systems, making a virtual copy of the physical world and making decentralized decisions (Lee et al., 2015).

It is seen that Germany, which introduced the concept of Industry 4.0 to the world, leads the researches published on this subject. As of 2016, half of the 56 studies evaluated included at least one researcher from Germany. Germany is followed by China with 11 studies. These are followed by developed countries such as England, Spain and America. It is seen that the concept of Industry 4.0 has started to find its place in the literature after 2014 and researchers and academic journals attach more importance to this issue (Pamuk & Soysal, 2018).

In addition to the academic perspective, we need to examine the use of industry 4.0 technologies in the manufacturing industry and in everyday life. Industry 4.0 is claimed to be beneficial in productivity, turnover growth, employment and investment.By examining its effects on a global scale, digital production technologies in the manufacturing sector; Sensors, control systems, radio frequency technologies. Using these technologies, many sectors such as automotive and textile sector increase production quantity and quality while saving time and labor.