


Chapter 50

Emerging Auditing Perspectives in the Age of the Fourth Industrial Revolution

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ABSTRACT

The purpose of this chapter is to investigate the role of audit activities and auditors in Industry 4.0. The preferred methodological approach in the study is a general analysis of auditing in Industry 4.0 in the form of a literature review. According to the purpose of the study, the effect and role of auditing big data, the internet of things, the cloud, artificial intelligence, and other components in Industry 4.0 are investigated. Furthermore, auditing activities that can be implemented in Industry 4.0 are presented as suggestions in the study. The study explains the role of auditing as a whole in Industry 4.0 as a consequence of examining audit activities for each component in Industry 4.0.

INTRODUCTION

The invention of the telegraph at the beginning of the nineteenth century allowed instant orders for products for enterprises and communication among people across the country. Towards the end of the nineteenth century, the invention of the phone made it possible for traders to talk with customers in real time. The rapid spread of the internet in the late twentieth century enabled the marketing of products and services in virtual environments, and the instantaneous transmission of consumer opinions. But the rapid progress of technology brought about various risks. This rapidity of communication has also triggered the rapid spread of fraudulent and incorrect information. The use of advanced technologies in the global world leads to more information being exchanged and spread over a wider area, and more audit practices (Jackson, 2013).

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There have been four industrial revolutions in history: Industry 1.0, known as “Mechanization,” the usage of mechanical systems and the emergence of mechanical production systems between the years of 1760 and 1840; Industry 2.0, known as “Mass Production,” the invention and use of electricity between the years of 1870 and 1914; Industry 3.0, known as “Computerization,” the integration of information technologies into industry between the years of 1960 and 2000; and Industry 4.0, the fourth industrial revolution.

When historical industrial revolutions are examined in general, it is clear that there has been a shift from mechanical and manual audits to digital audits. In the past, auditing had a highly manual and human-focused structure. Auditors often tried to examine, conceptualize, and audit systems using manual methods. It has been seen that audit methods have had to be changed because manual control processes are insufficient for auditing complex production processes and business activities. Instead of traditional audits, technology-driven instant audits are now being carried out, instant assurance can be obtained as a result of instant audits. Currently, the application of technology-based audit techniques eliminates the problems and negativity of manual control methods. Automatic auditing is rapidly spreading with audit software.

Industry 4.0 is not an unmanned factory. With the increased use of information technology, it is important to create a highly human-focused organization that adds value for all stakeholders. In this structure, there are concepts such as the internet, connected products, machines, people, organizations, and virtualization. With industry 4.0, modern automation systems, data exchange, and production technologies are being used intensively. Audit activities should also keep up with Industry 4.0. Due to technology-driven change in the industry, an audit structure based on automation occurs in enterprises. Technology is a very important part of many controls. With the fourth industrial revolution, auditors are also strongly influenced by automation. Technology is a necessary tool for auditors, as well as enhancing the efficiency and effectiveness of the audit process. Nowadays technology-enabled auditing is spreading rapidly, and due to the use of automatic audit tools, audits are becoming easier, more effective, and more efficient. The use of automation tools in auditing activities may also bring about institutionalization and standardization.

Computer assisted audit tools and techniques (CAATTs) particularly increase audit efficiency and effectiveness (Braun and Davis, 2003). Also, successful adoption of generalized audit software (GAS) by internal auditors would help broaden the development of the technologies in audit activities (Mahzan and Lymer, 2014).

In the Industry 4.0 environment, audit personnel are able to provide digitalized services such as continuous auditing, continuous monitoring, and anomaly detection (Dai and Vasarhelyi, 2016). Continuous auditing is implemented in non-written, real-time accounting systems, and is aimed at assessing whether the presented financial statements reflect the truth. It refers to bringing together audit evidence in the electronic environment (Rezaee et al., 2001).

Industry 4.0 brings production elements such as product, machine, and operator into communication with each other through an open internet network. In this revolution, a new generation of “smart factories” has been established, and this period has become a lifestyle of the production sector. Industrial computerized control systems are beginning to be used in production processes that evolve into a smart factory. Nonetheless, Common Control Systems are becoming widespread in conjunction with Programmable Intelligent Controls. Due to the creation of smart factories in industry 4.0, physical systems are being transferred to cybersystems. Also, objects communicate with each other and with people. As a result, decentralized decisions are made. With blockchain technology and decentralized decisions, audits

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