Chapter 1
Curtailing the Threats to Cloud Computing in the Fourth Industrial Revolution

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ABSTRACT

Cloud computing enables end users to make use of third party's resources to support their computing needs. The services offered by cloud computing make the technology very critical to the fourth industrial revolution. The benefits include cost minimization, scalability of services, speed, integration and higher data management, low innovation risk, and quicker response to organizational needs, among others. However, these benefits have been threatened by a number of security threats. This chapter seeks to curtail the effects of these threats by enlightening and educating users on the current ways to mitigate them. The chapter first defines cloud computing and highlights its relevance or benefits to businesses in the fourth industrial revolution. In addition, various security threats that are associated with cloud computing are brought to the fore. Thereafter, various measures that are used to mitigate the threats are discussed. The chapter concludes that with adequate enlightenment, the full benefits of cloud computing in industry 4.0 would be better enjoyed by users.

INTRODUCTION

The fourth industrial revolution, also known as Industry 4.0 has been viewed as an era where technology will play a major role like never before in the way that people live and relate to one another (Schwab, 2015). This era builds on the third industrial revolution, which had electronics and information technology at its centre. It combines information technology (dealing with business process and office automations) with operational technology (dealing with industrial process and factory automations). Since the fourth industrial revolution, which integrates various computational systems including sensor networks, Internet

communication infrastructure, intelligent real-time processing management, automated management of systems, and advanced robotics, will involve Big Data it requires a scalable data processing, which single individuals or organizations may not be able to handle in isolation. Thus, the Internet serves as the core in this era (Bloem et al., 2014). In other words, the fourth industrial revolution is expected to further tilt the world into a digitized entity – cyberspace, where human activities are more driven or dependent on centralized use of information and mechanical systems.

The Internet, the core of the fourth industrial revolution, serves as the converging point and superhighway on which every operation depends. It is estimated that Industry 4.0 will consist of about 50 billion connected devices. By implication, interdependence and shareability of resources among organizations are the top features of the fourth industrial revolution. This makes cloud computing a critical component of the fourth industrial revolution since the backbone of this era, which is the Internet, will mainly function by utilizing cloud computing services (Moavenzadeh, 2015). No wonder Alcorta (2017), the director, Policy, Research and Statistics, United Nations Industrial Development Organization (UNIDO), mentions cloud computing as one of the technological breakthroughs that will play a vital role in transforming manufacturing in the Industry 4.0 era.

However, while it is obvious that cloud computing will play a vital role in the fourth industrial revolution, as more resources will tend to be interconnected and shared, one major concern is the security of cyberspace (Alcorta, 2017; Bigger, 2015). Cyberspace, specifically cloud computing is witnessing some security challenges, or different forms of attacks, which seem to threaten the efficacy of the fourth industrial era if mitigating measures are not taken. Therefore, as part of measures to ensure a safer use of cyberspace and promote the success of the fourth industrial revolution, this chapter highlights some cyber threats that are detrimental to cloud computing and more importantly educates the audience on various ways by which the threats can be curtailed or mitigated.

BACKGROUND

Cloud computing signifies or represents a deviation from the traditional storage and management of computing resources which are limited by factors such as size, space and cost among others. Cloud computing describes an environment where computing resources can be accessed on a larger scale by users through the Internet and the Web (Chappell, 2011; Stair & Reynolds, 2016). It is simply a way of maximizing the use of resources while minimising cost. Perhaps a clearer description of cloud computing is provided by Rao, Leelaran, and Kumar (2013, p. 3390) who simply see cloud computing as "using the Internet to access someone else's software running on someone else's hardware in someone else's datacenter". Among resources that can be shared in a cloud are hardware, data storage and data management facilities, applications, and many other services (Hatwar & Chavan, 2015). These resources are not only shared simultaneously by multiple users but can be used in turns by re-allocation to users in different time zones. This way, less demand is made on the environment since less power, air conditioning and space would be required for the same services. Typical examples of cloud services include iCloud, Google drive, and Dropbox. Other services include those provided by social networking sites such as Facebook and LinkedIn (Kazim & Zhu, 2015). The most common example of cloud services that is used by most people is the electronic mail (e-mail) service provided by Google, Yahoo and other providers (Chou, 2013).

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