Chapter 2

The Use of an Enterprise Architecture Framework to Guide the Management of Big Data in Health Organisations

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ABSTRACT

Big data has gained popularity in recent years, with increased interest from both public and private organisations including academics. The automation of business processes led to the proliferation of different types of data at various speeds through information systems. Big data is generated at a high rate from multiple sources that can become complex to manage with challenges to collect, manipulate, and store data with traditional IS/IT. Big data has been associated with technical non-technical challenges. Due to these challenges, organisations deploy enterprise architecture as an approach to holistically manage and mitigate challenges associated with business and technology. An exploratory study was done to determine how EA could be used to manage big data in healthcare facilities. This study employs the interpretive approach with documentation as the analysis. Findings were governance, internal and external big data sources, information technology infrastructure development, and big data skills. Through the different EA domains, big data challenges could be mitigated.

INTRODUCTION

Many organisations are structured into different divisions and units of distinctive functionalities and mandates. In achieving their objectives, information systems and information technology (IS/IT) are deployed (developed and implemented) to automate business processes, and ultimately render effective and efficient services to its stakeholders (Muladi & Surendro, 2014). This has increased organisations dependence on IS/IT for organisational processes and activities. Van Zijl and Van Belle (2014) posit that IS/IT is an essential part of an organisation. The automation of business operations is one aspect of the essentiality, which leads to the proliferation of large amounts of digital information that is accessible through IS/IT (McAfee, *et al.,* 2012).

Through established organisational functions, different datasets with different sizes are generated from the business operations. Recently, organisational datasets are increasingly generated in varying formats and sizes (Lnenicka & Komarkova, 2019). In the health sector, big data is generated at high volume and rate from multiple sources, which makes it complex to the organisation to manage (Wang, Kung, & Byrd, 2018). This type of data is referred to as big data, and according to Park, Nguyen and Won (2015), big data is hard to collect, manipulate and store with traditional IS/IT. The size of big data is expressed in petabytes and exabyte's, which is challenging to store, manage and analyse by an average database tools and software (Wang, Kung, & Byrd, 2018).

The challenge is also based on the need to integrate the big data from the core business functions. Lnenicka and Komarkova (2019), posits that the combination of quantity, varying source and unstructured data can lead to technology challenges. It is imperative for IS/IT to be deployed holistically in order to ensure cost effective and sustainable solutions for the organisation over an extended period. Without a holistic view of the organisation's data needs, technical solutions can be deployed in isolation. Enterprise architecture (EA) is an approach employed by organisations to holistically manage and mitigate challenges associated with business and technology (Ahmadi et al., 2019). EA is developed to manage organisational complexities that exist between different departments that need to share the same equipment (Lapalme et al., 2016). In addition, EA is used to control and guide the installation of IS/IT based on business needs in order to fulfil the organisation's objectives (Shaanika & Iyamu, 2015). EA is also used to improve the management of complicated business processes and IS/IT in the organisation (Lapalme et al., 2016)

The aim of this paper is to explore how EA can be used manage big data in organisations. The paper will be organised as follows: section two presents literature review on big data and EA. Section three covers the research approach, followed

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