Chapter 62
Implementation of Big Data Analytics for Government Enterprise

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ABSTRACT

Within the South African government, there is an increasing amount of data. The problem is that the South African government is struggling to employ the concept of big data analytics (BDA) for the analysis of its big data. This could be attributed to know-how from both technical and nontechnical perspectives. Failure to implement BDA and ensure appropriate use hinders government enterprises and agencies in their drive to deliver quality service. A government enterprise was selected and used as a case in this study primarily because the concept of BDA is new to many South African government departments. Data was collected through in-depth interviews. From the analysis, four factors—knowledge, process, differentiation, and skillset—that can influence implementation of BDA for government enterprises were revealed. Based on the factors, a set of criteria in the form of a model was developed.

INTRODUCTION

Big data has attracted attention, not only from private organisations, but major governmental organisations as well (Cao, 2017). As with other sectors of the economy, large amounts of data have been generated by government of many countries (Archenaa & Anita, 2015). Big data is defined as large data sets with characteristics of high volume, variety, and velocity that cannot be easily stored, captured, managed, analysed effectively with traditional database storage software and methods (Ridge et al., 2015). The rate at which data is growing around the world is at a projected rate of 40% per year (Al Nuaimi et al.,

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2015). According to Berg (2015), big data presents challenges to organisations because of data that are too vast, growing at a very high rate that make it very hard to manage, and difficult to analyse using traditional methods and tools.

The concept of BDA refers to "*the use of advanced data analytic techniques on vast data sets (Big Data) to discover patterns and meaningful use of information*" (Bamiah et al., 2018:231). Thus, it is through the implementation of BDA tools (application) that organisations and government enterprises can derive value and insights from these voluminous datasets (Mehta & Pandit, 2018). (Bumblauskas et al., 2017:703) defined big data analytics (BDA) as "*the ability to analyse meaningful and relevant data and convert data to information, knowledge, and ultimately action in time to favourably influence an organisation is a key competitive differentiator"*. The BDA concept also presents government enterprises with opportunities of analysing the increasing amount of data in its repositories thereby enhancing its operations and decision-making processes (Medaglia, 2014). This includes BDA tools such as Hadoop, HDFS, MapReduce, Cassandra, and PIG to mention the few (Zakir et al., 2015).

This is compounded by the need to integrate the variety of separate legacy systems (silos). Insufficient funding is another challenge that is encountered in attempts to implement the concept in many governments' enterprises. Kim et al. (2014) explained that owing to the expensive nature of some information technology (IT) solutions such as the concept of big data, success is always threatened. Another major challenge pertains to the lack of technical expertise in the areas BDA because of its newness in many countries, particularly in developing world.

Furthermore, implementation of BDA tools requires stable and reliable IT infrastructure (Al Nuaimi et al., 2015). This includes components such as storage, networks, and telecommunications capabilities of these components (Kache & Seuring, 2017). Various organisations, including governments' enterprises have implemented BDA in their environments for various purposes, and with varying degrees of success. For example, countries such as Australia have implemented BDA tools to improve services in the education sector (Bamiah et al., 2018). This has led to enhanced learner performance, improved teaching and assessment methods and techniques (ibid). Whilst there are benefits to implementation of BDA tools, there are challenges from aspects of privacy and confidentiality issues (Hardy & Maurushat, 2017).

The aim of this study was to develop a criteria, which can be used to guide implementation of BDA within the South African government enterprises. In achieving the aim, two objectives were formulated: (1) to understand how big data within government enterprise is analysed; and (2) to examine and understand the factors that can facilitate the implementation of BDA.

CONTEXTUALISING THE RESEARCH PROBLEM

Globally, government enterprises are among the largest and influential companies in an economy (Kowalski et al., 2013). These enterprises occupy key and strategic sectors of the economy and become pillars of national economies whilst having economic, political and social responsibilities (Liu & Zhang, 2016). In South Africa, these enterprises play a vital in the economy and in the delivery of services in energy, transportation and telecommunications sectors (Thomas, 2012). Further, Thomas (2012) discusses that South African government enterprises aim to develop the country by reducing income inequalities, increase employment, and contribute to the development of the country. However, these enterprises have been exposed for their inefficiencies because of corruption, poor governance among the challenges which in turn are a burden to the same economy they seek to vitalize.