Chapter 69
Exploring Factors Influencing Big Data and Analytics Adoption in Healthcare Management

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ABSTRACT

Demand for improvement in healthcare management in the areas of quality, cost, and patient care has been on the upsurge because of technology. Incessant application and new technological development to manage healthcare data significantly led to leveraging on the use of big data and analytics (BDA). The application of the capabilities from BDA has provided healthcare institutions with the ability to make critical and timely decisions for patients and data management. Adopting BDA by healthcare institutions hinges on some factors necessitating its application. This study aims to identify and review what influences healthcare institutions towards the use of business intelligence and analytics. With the use of a systematic review of 25 articles, the study identified nine dominant factors driving healthcare institutions to BDA adoption. Factors such as patient management, quality decision making, disease management, data management, and promoting healthcare efficiencies were among the highly ranked factors influencing BDA adoption.

INTRODUCTION

Recent deliberations and developments on Big Data and Analytics and (BDA) have primarily resulted in many firms gaining leverage on data utilization due to availability of big data (Trieu, 2016; Popovic, Hackney, Coelho, & Jaklic, 2012; Visinescu, Jones, & Sidorova, 2017). Business Intelligence and Analytics capabilities have therefore provided a lot of opportunities for organizations operations and quality in decision making (Popovic, Hackney, Tassabehji, & Castelli, 2106; Wang & Hajli, 2017; Hagel,

2015; Agarwal & Dhar, 2014). For example, BI capabilities implementation results in creating business values (Wang & Hajli, 2017). Business values are, therefore, categorised into "organizational benefits, operational benefits, IT infrastructure benefits, managerial benefits and strategic benefits" (Wang & Hajli, 2017). Popovic, Hackney, Tassabehji and Castelli (2016) also indicated that application of BDA enhances business performance. Innovations in Business and Analytics through visual analytics have indeed improved how information is reported through dashboards and scorecards for quick decision making by managers (Turban, Ramesh, Delen, & King, 2011). Also, BDA tools like data mining have given organizations a lifeline to improve customer relationship and resolve intricate organization problems (Persson & Riyals, 2014).

The healthcare sector has also seen a tremendous growth of adopting BDA due to the enormous opportunities it offers (Chen, Chiang, & Storey, 2012; Denaxas & Morley, 2015; Wang & Hajli, 2017; Costa, 2014; Raghupathi & Raghupathi, 2014). Studies over the past decades have demonstrated that the integration of BDA with other health systems such as Electronic health (E-Health) systems, Telehealth systems and health care ecosystems, in general, improve healthcare (Luo, Wu, Gopukumar, & Zhao, 2016; Mehta & Pandit, 2018). Arguably, the healthcare sector is perceived to generate large volumes of data ranging from patient records, biomedical data and administrative records which are difficult to manage through traditional storage applications and analytical tools (Sakr & Elgammal, 2016). For example, data aggregation through BDA have enhanced healthcare data to be standardized (Shah & Pathak, 2014) and the agility to decision making (Wixcom, Yen, & Relich, 2013). Quality decision making in healthcare management is tremendously improved through the use of BDA (Chen et al., 2012). It is therefore essential to note that healthcare sectors efforts in the adoption of Big data and Business Intelligent provides business values (Wu, Li, Cheng, & Lin, 2016). Other studies revealed that the level of digitization of healthcare systems and continuous reliance of information technology to provide safe healthcare mostly contributed to BDA adoption (Agarwal, Gao, DesRoches, & Jha, 2010; Nicolini, Powell, Conville, & Matinez-Solano, 2008).

Albeit all the many successes BDA offers to the healthcare sector, it hinges on several factors or the intention of deployment and usage. These factors, when neglected, would lead to failure or undermine the sole purpose for BDA adoption in healthcare. The present study from IS literature posits several factors that regularly affect the benefits accrued to any new technology adopted by organizations. For example, Hung, Huang, Lin, Chen, and Tarn (2016) addressed specific factors influencing BDA adoption in no small extent. More importantly, healthcare preparedness and knowledge towards BDA implementation and application. Besides, there is lack of understanding of these factors from literature specifically attributed to BDA adoption for healthcare institutions (Murdoch & Detsky, 2013; Shah & Pathak, 2014; Watson, 2014) and evidence indicates that 60% failed in the quest (Deloitte Centre, 2015). Even though, these factors have resulted in some level of benefits firms could derive from new technology, Angeles (2013) emphasised a need for a clear direction for firm's technology to align to the new demands with innovations. Tornatzky and Fleischer (1990) have argued that firm's preparedness for new technology adoption is often by the level of technical abilities the firm has, characteristics of the organization and environmental context within which the firm operates. BDA adoption is, therefore, considered as new IS technological innovation that comes with its challenges and factors in its implementation, especially, for healthcare management (Safwan, Meredithand & Burst, 2016). There is, therefore, the need to explore further the factors leading to the success or failure of BDA adoption among healthcare institutions and more importantly, how developing countries can leverage from established healthcare institutions.

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