

**THE INFLUENCE OF BIG DATA ANALYTICS ON
ORGANISATIONAL PERFORMANCE: A COMPARATIVE STUDY OF
THE TECHNICAL UNIVERSITY OF KENYA AND STRATHMORE
UNIVERSITY**

**BY
LUCY WACHERA KIBE
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ABSTRACT

This study investigated the influence of big data analytics on organisational performance of academic institutions in Kenya. The Technical University of Kenya (TUK) and Strathmore University (SU) provided the context for the study. They provided insights into the differences and/or similarities between the influence of big data analytics on organisational performance from the perspectives of private and public universities in Kenya. Previous studies on big data analytics have primarily focused on theorisation and formulation of expectations with positive aspects of big data analytics. However, within current literature the influence of big data analytics on organisational performance has received less attention. The specific objectives of the study were to: establish the characteristics of big data produced by the TUK and SU; investigate the techniques and tools used in big data analytics in the TUK and SU; examine the relationship between big data analytics and organisational performance of the TUK and SU; and propose strategies for enhancing the positive influence of big data analytics on organisational performance of TUK and SU. The study adopted convergent parallel mixed methods research design. Quantitative and qualitative data was collected using questionnaires and key informant interviews. The target population for the study was 22,050 respondents consisting of clients (students) as well as ICT staff, directors and managers from both TUK and SU. Information-oriented purposive sampling was used to select information-rich subjects. This gave TUK a sample size of 580 and 114 for SU. Quantitative data was analysed using Statistical Package for Social Sciences (SPSS) while the qualitative data was analysed using thematic analysis. This study established that five of the variables of organisational performance have a positive relationship with big data analytics in both institutions while two had a negative relationship in TUK. The variables with positive relationship were: innovativeness, creativeness, effectiveness, productiveness and efficiency. Whereas competitiveness and profitability had a negative relationship in TUK, the same had a positive correlation in SU. The findings confirm that big data analytics support academic organisations to perform their functions better. The study recommends that academic institutions should develop strategies and policies on big data analytics to guide them on how to maximise its benefits. The findings can be used to enhance organisational performance of academic institutions by facilitating effective decision making as well as strategy formulation and execution.

Keywords: big data analytics, organisational performance, academic institutions, Technical University of Kenya, Strathmore University, Kenya.

CHAPTER ONE

INTRODUCTION AND BACKGROUND OF THE STUDY

1.1 Introduction

Organisations are daily producing unstructured and multi-structured data. This has brought about an increase in the volume and diversity of the data produced as the years go by (Savva, 2011). This growing data has been described as big data. Whereas Jacobs (2009) asserts that big data is data whose size and density forces manipulators to use advanced technologies to be able to gain insight from it, Russom (2011) states that it is the quantity of information resources an organisation generates or acquires over time. Russom adds that the continuous accumulation of big data may lead to information explosion. Laney (2012) views big data in terms of velocity, volume and variety, commonly known as “3Vs”. This means that these datasets are not only voluminous; they are also generated fast, and are found in diverse formats. Therefore, big data prevails in different sizes and formats. The description of big data differs from organisation to organisation subject to existing procedural, organisational and infrastructural capacity to manage the data an organisation produces, conveys or collects. In most organisations, big data is dispersed in different locations and with diverse personnel. The existence of big data is dictated by the rising ability of people and organisations to create and share content easily on the Internet and other Information and Communication Technology (ICT) platforms. Similarly, the increase in the advancement and ubiquity of technologies such as mobile devices has enabled users to connect to the Internet in real-time leading to the production of large amounts of data.

According to Boyd and Crawford (2012), analysing big data is challenging and requires high performance exemplified by fast processing and retrieval speeds. Currently, most organisations are thriving by using the data they generate during their day to day operations. Hence, data is viewed as gold; and like gold, it needs to be refined to enhance its value. Data refining can be done by subjecting the data to analytics which enables organisations to extract usable and treasured information from the enormous, diverse and complex datasets they generate. Villars, Eastwood and Olofson (2011) define big data analytics as the new techniques developed to carefully extract value from large sets of diverse data thereby enabling their capture and fast use. The definition of big data analytics encompasses the tools and procedures used on large and scattered datasets to bring out meaning (Mithas, Lee, Earley, Murugesan and Djavanshir, 2013). Through the analytics, organisations are able to identify the different types of data they produce. In addition, the analytics enables organisations to generate insights from the data

thereby improving decision making. Chen, Chiang and Storey (2012) affirm that organisations are able to understand the types of data they produce and the extent to which the datasets are used to leverage their performance.

Big data analytics is categorised into descriptive, diagnostic, predictive and prescriptive analytics (Russom, 2011). Descriptive analytics assists organisations to realise their past and current performance targets by making informed decisions. Diagnostic analytics deals with exploratory data analytics of existing data to discover the root cause of problems in an organisation. Predictive analytics examines historical data and combines it with rules and algorithms to find meaning from large amounts of data (Hazen, Skipper, Boone and Hill, 2016). Prescriptive analytics enables organisations to not only look at the future but also at the opportunities that are potentially out there (Basu, 2013).

Lavelle, Lesser, Shockley, Hopkins and Kruschwitz (2013) assert that the highest performing organisations use big data analytics approaches to enhance their performance. This implies the use of arithmetical tools, procedures, imitations and optimisations (Russom, 2011). Bryant, Katz and Lazowska (2008), emphasise that big data can only be meaningful if it is analysed and catalogued well so as to enhance its real-time access by the users. When big data is synthesised to reveal the patterns and trends, organisations can expect higher efficiency and effectiveness. The more organisations recognise the fact that they are data-driven, the better they perform by achieving their objectives and targets as well as financial sustainability. The rise of globalisation and information technology has enabled big data analytics to rise as a newfangled technique that extracts value out of the large data thereby enhancing organizational competitive advantage (Chen, et al., 2012). Most organisations have adapted it to unravel difficulties in procurement, inventory and logistics.

Strausser (2015) asserts that universities are becoming fascinated by using big data analytics to support students' work and also to make better decisions and improve their operations. For instance, universities are able to know more about their students through data mining and analytics based on students' digital foot prints. This is achieved by the use of technology to map activities the students and staff undertake online by collecting and analysing the data. This helps in learning the entire range of activities and hence works towards achieving the best from all. Strausser (2015) further asserts that universities need to move from the application of big data analytics to improve academics and administrative performance by merely collecting data

that reports past accomplishment to more detailed analysis that connects the dots for future endeavour. For instance, this can be achieved by the use of descriptive analytics that shows what happened and why it happened. It may also involve predictive analytics that suggests what will happen and offers insights into how it can be made happen.