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Success Factors of Big Data to Achieve Organisational Performance: Theoretical Perspectives

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Organisations have found an increase in the complexity of their information environments and emerging from this is the concept of "Big Data", which is considered a breakthrough technological development in both business and academia. Hypothetically, superior big data analytics capability provide organisations with a competitive advantage and is therefore important to develop. This part of the study conducts a comprehensive literature review, with a focus on the success factors of big data from an organizational context: how and when big data analytics capabilities yield benefits and improve organisational performance. It concludes with the following research questions: 1. What is the general understanding of big data and its current situation? 2. What capabilities are required in order to be successful at translating big data insights into organisational performance? 3. What are the biggest challenges/ risks to converting big data insights into organisational performance?

Keywords: *Big Data, Success Factors, Organisational Performance, Value*

JEL Classification: *O30, L26*

1. Introduction to the Research Problem

1.1. Research Statement

Investigation into the success factors of Big Data (BD) in order to understand how and when big data analytics capabilities (BDAC) yields benefits and improves organisational performance.

1.2. Introduction and Description of the Problem

Organisations have found an increase in the complexity of their information environments owing to the development of extensive digital technologies (Caesarius and Hohenthal, 2018). As a result, the volume of available data has increased exponentially resulting in more advanced data analytics capabilities (Henke et al.,

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2016). A large survey conducted by MIT Sloan Management Review, in partnership with IBM Institute for Business Value, revealed that there is a prevalent belief that analytics offers value with top performing organisations using analytics five times more than worse performing organisations (LaValle et al., 2011). As a result businesses are making improvements in analytical capability a top priority (LaValle et al., 2011).

Emerging from the complex information environment is the concept of "Big Data", which is considered a breakthrough technological development in both business and academia (Günther, Mehrizi, Huysman and Feldberg, 2017; Sheng, Amankwah-Amoah and Wang, 2017). Big data is now a mainstream activity of an organisation since routine business today generates an immense amount of structured and unstructured information about external customers, suppliers, competitors and internal processes, operations and routines (Janssen, van der Voort and Wahyudi, 2017; Erevelles, Fukawa and Swayne, 2016; Kabir and Carayannis, 2013). Organisations are also able to capture communication data due to the general adoption of mobile devices, tablets, online social media activity (e.g. Facebook, Twitter) and use of instruments, machines and transmissions (Kabir and Carayannis, 2013; EY, 2014; Wamba, Akter, Edwards, Chopin and Gnanzou, 2015; Liu, Wang and Lin, 2017; Braganza, Brooks, Nepelski, Ali and Moro, 2017).

Big data generates more data than organisations are able to use and is characterised by unprecedented large volumes, high velocity and extensive variety. Volume refers to the amount of data created per day, velocity is the speed at which the information can be retrieved and variety is the varying sources from which the data is generated.(McAfee, Brynjolfsson, Davenport, Patil and Barton, 2012; Caesarius and Hohenthal, 2018; Günther et al., 2017; Erevelles et al., 2016). As a result, big data has become a source for innovation and competitive advantage by transforming decision making and potentially leading to new strategic methods (Günther et al., 2017; Erevelles et al., 2016).

Akter, Wamba, Gunasekaran, Dubey and Childe, (2016) report 5-6% higher profitability in organisations with superior big data analytics capability (BDAC) and goes a long way to explaining the peaked interest and corporate emphasis on BDAC in the last decade (Vidgen, Shaw and Grant, 2017). BDAC topics have also recently increased in popularity in the academic literature in the context of big data management, processing and analysis, in order to create ideas, sustain value, measure performance and attain competitive advantage (Wamba et al., 2017). The term BDAC has been referred to in the literature as the "next big thing in innovation", "fourth paradigm of science", "next frontier for innovation, competition, and productivity", "new paradigm of knowledge assets" and "next management revolution" because of the universal adoption of BDA technologies (Wamba et al., 2017; Akter et al., 2016).

Business and academia are focused on the potential opportunities big data can bring to organisations (Günther et al., 2017). Big data was described by Kabir and Carayannis (2013) and again by Caesarius and Hohenthal (2018) as a source of IT-enabled competitive advantage for an organisation. BDAC has become current practice for decision making in order to use insights to generate real value, gain competitive advantage and be more innovative (Saggi and Jain, 2018; Wamba et al., 2017). The deeper insights afforded through big data can also potentially increase an organisation's economic returns (Braganza et al., 2017; Kabir and Carayannis, 2013). Insights provided by big data can help improve efficiency and effectiveness of operations, financial performance as well as strategy (Günther et al., 2017; Caesarius and Hohenthal, 2018). Wamba et al. (2017) provide three successful BDAC examples in practice; Target corporation used BDAC to predict future buying trends, Amazon made personalised purchase recommendations and GE improved their gas turbine and service efficiency. BDAC can have an impact in a variety of industries where a big data initiative is prompted by important issues business leaders have identified (Wamba et al., 2017; Braganza et al., 2017).

The growth of big data tools is powered by the need for knowledge depth in order to effectively derive insights from information and become the basis for competition (EY, 2014). Organisations over the last decade have attempted to utilise BDAC to capture value and find new insights within the business processes and performance (Kabir and Carayannis, 2013). The outcomes have been underwhelming with mostly limited results and unsustainability found (Caesarius and Hohenthal, 2018). This is supported in the literature with many single, and very few multiple, instances of big data deployments reported (Braganza et al., 2017). Braganza et al. (2017) posit that either big data only delivers benefits once or senior managers don't consistently commit resources to big data initiatives. Amazon, Facebook, Google, Netflix, Dell, eBay, LinkedIn, Procter and Gamble, Target, Tesco, UPS, Walmart, and Zara are examples of organisations who have been successful at sustaining BDAC and setting the example (Caesarius and Hohenthal, 2018). The majority of these companies had a head start by embracing digital technologies at their inception (born digital) and have highly digitised operations (Caesarius and Hohenthal, 2018). This is not the case for the majority of current organisations where they have not been able to successful and sustainably utilise big data to its full potential and exploit its benefits (Caesarius and Hohenthal, 2018; Erevelles et al., 2016).

This indicates the complex nature of converting big data into sustainable competitive advantage

(Erevelles et al., 2016). LaValle et al. (2011) indicated that 60% of their surveyed respondents feel innovating for competitive advantage is difficult and a key challenge is therefore for organisations to understand how to leverage big data insights in order to create organisational value (Vidgen et al., 2017). This is in contrast to the outdated opinion that the technology and data management is the top concern in BDAC (LaValle et al., 2011). In fact, LaValle et al. (2011) show that management and cultural issues provide more of a barrier to success with lack of understanding of how to use the analytical insights preventing business improvement. Even though an organisation may extract big data insights successfully, there is no guarantee they will be able to utilise those insights lucratively (Erevelles et al., 2016). Without ensuring the organisation is streamlined around big data and employees educated of the proactive uses of the insights, the value will most certainly not be recognised (Erevelles et al., 2016). Caesarius and Hohenthal (2018) state that even though organisations understand that they are in data-rich environments, they do not know how to exploit that data and Y. Wang, Kung and Byrd (2018) confirm this with a study that found 77% of organisations could not describe how BDAC will impact their business performance and competitive advantage and this could start to explain why Erevelles et al. (2016) states that more than 50% of big data initiatives do not achieve their targets. Akter et al. (2016) concur with Erevelles (2016), stating that although many organisations have developed BDAC with the intention of enhancing company performance, few have achieved that impact. Braganza et al. (2017) posited three possible explanations; lack of a business process for big data projects, dispersed resources that may not be within the organisations control and network of relationships on which big data relies are fluid and fleeting.

Given the number of articles appearing in business publications on transforming big data into value (EY, 2014; Henke et al., 2016; LaValle et al., 2011; McAfee et al., 2012), it is not expected that companies struggle to realise potential of BDAC but often literature focuses on the technological aspects of big data. Technology concerning big data has progressed over the last several years to the point where it is not the limiting factor in successfully converting BDAC into organisational performance (Gupta and George, 2016). Literature and business have so far underestimated the importance of other resources such as, human skill and organisational culture with little theoretical insight (Caesarius and Hohenthal, 2018; Gupta and George, 2016).

The academic literature is at the early stages of investigating the effects of BDAC on organisational performance. As a result, many different theories and constructs have been put forward theoretically, including combinations of constructs from different theories to generate new models quantitatively surveyed. But there has been no emergence of a dominant combination of theory and constructs and as such the literature is scattered and inconclusive. Since big data is a new type of information system (IS) capability, the starting point has been to utilise the theories and methods found in the IS literature with regards to IS capability improving organisational performance, decision making, value generation and competitive advantage. As such, three theoretical frames of reference have been considered; Knowledge-based theory (KBT), Resource based theory (RBT) and Dynamic capabilities (DC). They can provide three distinct views of big data individually and collectively examine big data processes, relationships and resources (Braganza et al., 2017). RBT is currently the most utilised in the BDAC literature, but DC has started to become more prevalent.

The literature has currently provided limited explanation on how organisations translate BDAC potential into social and economic value, competitive advantage and organisational performance (Günther et al., 2017). The understanding of the organisational-level usage of BDAC has been limited by the lack of a holistic view of BDAC that includes the associated capabilities (D. Q. Chen, Preston and Swink, 2015). For big data to fully live up to its potential, there is a need to examine how management and strategy impact BDAC and to explore the process of leveraging BDAC to accomplish business value (Y. Wang, Kung, Wang and Cegielski, 2018). The literature is yet to understand how and why some organisations are successful and what combinations of practically implemented capabilities have led to successful big data initiatives that generate value, competitive advantage and therefore improved organisational performance. More specifically, research is required to understand what strategies are created to realise value from BDAC (Günther et al., 2017). As such there is a call for this type of qualitative exploration in this field (Vidgen et al., 2017; Y. Wang and Byrd, 2017).

1.3. Research Purpose

The purpose of this research is to answer the call for exploration into the success factors of Big Data (BD) in order to understand how and when big data analytics capabilities (BDAC) yields benefits and improves organisational performance (Vidgen et al., 2017; Y. Wang and Byrd, 2017) as well as the call from organisations to help with their challenge of knowing how to make better use of their data and generate value from big data (Günther et al., 2017). The research will look at the key management capabilities, technology capabilities, talent capabilities and strategy alignments required for success.(Akter et al., 2016; Noblet, Simon and Parent, 2011). This will help organisations understand how to create BDAC that will lead to superior

organisational performance (Gupta and George, 2016).

This is significant for business because BDAC is a growing field of interest and is used constantly within the business environment to attain and use knowledge for organisational performance and competitive advantage. Since organisations are unsure how to capture business value, research into how to generate value from BDAC is highly desirable and also rare in the current academic literature (Erevelles et al., 2016). Just using technology to attain and store the data is not enough (Wang, Kung and Byrd, 2018). The ability to understand how to structure and manage big data initiatives in order to translate the data into insights and have the ability to quickly act on that insight is imperative to achieve success in making a positive impact on the organisation's performance. Wang, Kung and Byrd (2018) in a recent article state the urgent need for a better understanding of the strategic implications. The literature seems to assume BDAC processes exist in practice but Braganza et al. (2017) point out the lack of coherent processes to manage BDAC resources. This research can start to define the appropriate management processes for big data initiatives. Organisations can gain from the understanding of how to better implement BDAC and the challenges they may face on the journey (Caesarius and Hohenthal, 2018). The results of this study could aid organisations in developing an outline for repeatable implementation of big data initiatives allowing full benefits and big data potential to be realised. This can provide guidance to anyone implementing a BDAC initiative at a company.

This research is theoretically significant because although research into big data has been growing rapidly, there are still many knowledge gaps, notably a missing link between analytics capabilities and organisational performance (Liu et al., 2017; Akter et al., 2016). This research will fill the gap of more qualitative exploratory research within the field of BDAC and organisational performance. The result of the qualitative analysis will hopefully provide more detail into the significant antecedents required to build a model with which to quantitatively test in future work. At present, literature has no consensus over the capabilities that make up BDAC, with every study using a different set to define their models. This research will aim to identify the important variables that constitute BDAC to start bringing some convergence to this space in the literature. This will allow for comparison of results in different studies for progress towards some definitive conclusions about what aspects of BDAC are required for sustainable organisational performance.

1.4. Research Aims

Exploration into what the success factors of Big Data (BD) in order to understand how and when big data analytics capabilities (BDAC) yields benefits and improves organisational performance. The research looks at the key management capabilities, technology capabilities, talent capabilities and strategy alignments required for success and highlights key challenges. This helps organisations understand how to create BDAC that will lead to superior organisational performance.

Research objectives include:

- Conduct a literature review of BDAC and organisational performance as well as the theories used in order to determine a semi-structured interview framework and provide context within which to analyse the responses
- Determine practically what capabilities are required in management, technology, talent and strategy in order to be successful at translating BDAC into organisational performance
- Conceptualise success factors that can add to and improve a BDAC model with the findings from the in depth, expert interviews that can later be tested quantitatively and will add to the need to converge the literature on this topic

The scope includes companies who have technological capability for big data and implement big data initiatives at various levels within the organisation or big data consultancies. The research does not include an industry comparison or a determination and comparison of the big data maturity in particular organisations.

2. Literature Review

The literature review was conducted in order to understand the environment of big data within business. Existing academic sources were consulted in order to define big data and big data analytics as well as to outline the current academic stance on big data's impact on business. The impact was reviewed through the big data capabilities and success factors (requirements and prerequisites for a successful big data implementation in order for the potential of big data to be exploited), big data practicalities and failures (known challenges and factors contributing to big data initiatives not meeting objectives) and big data value and innovation (how big data is used to contribute to organisational performance through value creation).

2.1. Big Data

2.1.1. Big Data Environment

The rise and evolution of digital technologies has created a constantly changing, uncertain environment (George, Haas and Pentland, 2014). This in turn has changed the way organisations function, with an increased dependency on digital improvements and utilisation of new solutions and applications for decision making (Elgendy and Elragal, 2016). New technologies generate a large amount of data, which is arriving from many different sources, such as computers, smartphones, tablets, sensors, social media, audio, video, spatial and geolocation data, machines, internet of things, clickstream data, user generated content, business transactions etc. (Chang et al., 2014; George et al., 2014; Wamba et al., 2015; Akter et al., 2016; Braganza et al., 2017). This creates an environment where the data is difficult to manage with current tools and there is a need to store and analyse data in new ways in order to capture value (George et al., 2014). This has become known as big data and it is a global phenomenon (Elgendy and Elragal, 2016; Braganza et al., 2017).

The word "big", does not imply that big data is about the size or amount of data only, but rather the complexity of the data and how the data is captured and managed (Caesarius and Hohenthal, 2018). Traditional technologies are not able to fully analyse big data properly and take advantage of its potential. Therefore, big data begins to move away from traditional data management in organisations and onto new methods within three main areas; data discovery, data integration and data exploitation (Caesarius and Hohenthal, 2018). The importance of big data is its ability to produce knowledge and generate insights that were not possible with traditional methods. Big data insights can replace or complement static, non-real time traditional methods, such as surveys, statistics and archival data in order to close both the knowledge and time gaps that organisations have traditionally occurred (George et al., 2014).

Wang, Kung and Byrd (2018) presented a history of big data beginning in 1997 when Michael Cox and David Ellsworth first used the word to explain data visualisation and the challenges it would pose to computer systems. Even though the end of the 1990s had seen rapid IT and technology improvements, the data generated was still, to a large extent, unusable. Big data's evolution took place in the period from 2001 to 2008 when software developments started to be able to handle the immense amount of information. 2009 saw big data's revolution when big data computing became an asset for business intelligence and data management was making the move from structured to unstructured data as well as from a static environment to a cloud-based environment (Y. Wang, Kung and Byrd, 2018). Software-as-a-service (SaaS) is a cloud-based big data service that is increasingly being utilised due to its lower cost than owning and maintaining servers to store large amounts of data environment (Y. Wang, Kung and Byrd, 2018).

Today's environment is one in which everyone is surrounded by technology, data is everywhere and big data has become a "buzzword" (Vidgen et al., 2017; Sheng et al., 2017). Akter et al. (2016) explain that the exponential realisation of the importance of big data is due to the many new technologies that create and capture data. Kabir and Carayannis (2013), on the other hand, describe the emergence of big data as due to the value creation opportunities the improved data collection, storage, processing and transportation technologies have allowed. Caesarius and Hohenthal (2018) describe big data as a product of the information era and more specifically than Akter et al. (2016) postulate that the wealth of data is due to the increased digital dependency arising from four main technology developments. The first is the advancement in database technologies together with this digitisation, which has allowed for data to be better stored and accessed. Secondly, the development of the internet has caused cultural change as well as new means of communication and improved information management. The social media meteoric rise is the third influencer where enablement of improved collaboration and innovation could take place. Lastly. the internet of things allows for network connectedness without the need for human involvement and provides a combination of actions (e.g. detecting, recording, and responding) by default (Caesarius and Hohenthal, 2018). Erevelles et al. (2016) and Sheng et al. (2017) also stated the importance of the growth of the internet of things in reinforcing the importance of big data, where thirty-two billion objects are expected to be connected online by 2020. The utilisation of big data for business is expected to grow 23.1% annually between 2014 and 2019 with an annual spend of 48.6 billion dollars (Chen and Zhang, 2014; Lee, 2017).

Big data has proven more and more useful in improving business performance and has today become the main source for innovation and competitive advantage by transforming decision making and potentially leading to new strategic methods (Günther et al., 2017; Erevelles et al., 2016). This is also represented by a shift in the literature to not focus solely on the amount of data but also on how smart the data is at generating insights, value, and improved performance (George et al., 2014; Wamba et al., 2015). The literature is predominantly positive towards big data with Braganza et al. (2017) calling it a "global phenomenon" and Kabir and Carayannis (2013) describing how useful big data is to an organisation and calling it a "unique

knowledge resource".

There is a vast number of papers in recent literature on big data and its applications, demonstrating the significance of big data (Chen, Chiang and Storey, 2012; Chen and Zhang, 2014; Chen et al., 2015; De Mauro, Greco and Grimaldi, 2015; Hashem et al., 2015; Wamba et al., 2015; Akter et al., 2016; Elgendy and Elragal, 2016; Erevelles et al., 2016; Ram, Zhang and Koronios, 2016; Braganza et al., 2017; Gil, Song, Aldana and Trujillo, 2017; Lee, 2017; Sheng et al., 2017; Vidgen et al., 2017; Wamba et al., 2017; Saggi and Jain, 2018). Academia and business understand the positive impact big data can have on business process improvement, product development, cost reduction, marketing, operational capabilities, employee effectiveness and strategic innovation (Kabir and Carayannis, 2013; Wang, Kung and Byrd, 2018), but there is uncertainty in the business environment about what big data really is and the potential benefits and risks associated with utilising big data (EY, 2014). The academic environment is no different with the large majority of big data papers being dedicated to technical aspects and information management rather than functional aspects of big data (Sheng et al., 2017). This could explain the lack of understanding of how to apply big data in order to generate value and is a gap in the literature that needs to be explored and will be part of this study.

2.1.2. Big Data Definition

Gupta and George (2016) convey the term big data to be a description of lots of complex, real-time data requiring sophisticated techniques for insight extraction. There is no consensus on a single definition for big data in the literature and some academics have suggested that the definition for big data changes with time due to there being no limit as to the amount or type of data that can be classified as big data (Sheng et al., 2017). The word "big" within the term big data draws attention to the size of the dataset as a defining characteristic but the ability of the data to provide smart insights is more accurate of what distinguishes big data from traditional data (George et al., 2014; Gupta and George, 2016).

Although no single definition can be agreed upon, the predominant consensus in literature is the uniqueness distinguishing big data from a traditional large database (Sheng et al., 2017). This uniqueness was initially represented by what was known as the Three V's (Braganza et al., 2017; Sheng et al., 2017) of big data and many academics use this definition in the literature to date. (Constantiou and Kallinikos, 2015) state that "Big data can be defined based on large volumes of extensively varied data that are generated, captured, and processed at high velocity" and (De Mauro et al., 2015) define big data as "the information asset characterized by such a high volume, velocity, and variety to require specific technology and analytical methods for its transformation into value". The Three V's are volume, variety and velocity (Erevelles et al., 2016; Gupta and George, 2016).

Volume refers to the magnitude of the data generated and datasets are always increasing in size with a ten-fold increase in the digital universe expected from 2013 to 2020. Structured, semi-structured and unstructured data are now also available and this refers to the variety of big data. The shift to using more unstructured data is a key difference between traditional data and big data and allows big data to provide a data richness that traditional data could not. Structured data refers to sensor data, questionnaires and records but unstructured data provides access to blogs, text messages, videos, images and audio recordings (Erevelles et al., 2016; Sheng et al., 2017). The third aspect is velocity which refers to the speed at which data is generated and delivered. This is extremely important for achieving as close to real-time decision-making as possible and sets big data apart from traditional data (Erevelles et al., 2016; Sheng et al., 2017).

Chen, Mao and Liu, (2014) describe how they use a fourth "V" to define big data called Value. This aspect refers to the insights and benefits that can be gained from big data and the worth attributed to these insights (Wamba et al., 2015). A fifth "V", called Veracity was added as another dimension to the definition of big data (Gandomi and Haider, 2015; Gupta and George, 2016). Veracity refers to the messiness or quality of the data. The Three V's together with Value and Veracity represent what is known in literature as the Five V's definition of big data and this represents the complexities business face to extract value from the insights big data can generate (Erevelles et al., 2016; Wamba et al., 2015). Based on the Five V's definition, (Sheng et al., 2017) define big data as "extremely large amount of structured, semi-structured or unstructured data continuously generated from diversified sources, which inundates business operations in real time and impacts on decision-making through mining insightful information from rambling data" and Wamba et al. (2015) define big data as "as a holistic approach to manage, process and analyse 5 Vs (i.e., volume, variety, velocity, veracity and value) in order to create actionable insights for sustained value delivery, measuring performance and establishing competitive advantages."

The Five V's of Big data definition is extended to include Valence and Variability and become the Seven V's definition, which provides an all-encompassing view of big data (Erevelles et al., 2016; Günther et al., 2017; Braganza et al., 2017; Janssen et al., 2017). Saggi and Jain (2018) explore the seven V's

characteristics of big data where valence refers to the connectedness of the data collected and variability refers to constant and rapid changing of the data meaning. With all seven characteristics, big data has become a source for innovation and competitive advantage by transforming decision making and potentially leading to new strategic methods (Erevelles et al., 2016; Günther et al., 2017; Saggi and Jain, 2018).

As this research is about the functional application of big data initiatives and the capabilities required in order to bring about organisational performance, Comuzzi and Patel (2016) definition of big data is chosen which states, "the ability to harness information in novel ways to produce useful insights of goods and services of significant value and to extract new insights or create new forms of value".

2.2. Big Data Analytics Capability (BDAC)

2.2.1. BDAC Definition

The term analytics refers to tools that are able to discover trends in data (Erevelles et al., 2016). Vidgen et al. (2017) highlights the importance that analytics needs to transform data into actionable insights. BDAC specifically has emerged as an important topic and Wamba et al. (2017) demonstrated the positive and enthusiastic approach academics are taking towards BDAC with descriptions such as, "fourth paradigm of science", "new paradigm of knowledge assets" and "the next frontier for innovation, competition, and productivity". Similar to big data, there is no consensus on a single definition for BDAC but the concepts contained within the literature definitions are very similar, even if terminology differs slightly (Y. Wang, Kung and Byrd, 2018). Generally, BDAC refers to the holistic approach to managing, processing and analysing huge volumes of incongruent data to determine actionable ideas and reactions to the data for sustained value and competitive advantage (Wamba et al., 2015; Wang, Kung and Byrd, 2018).

The formulation of BDAC utilises deeper IT functionalities that allow the visualisation of data instead of focusing only the processes for analysing data. This approach provides a valuable method for investigating the efficacy of analytics systems to support operational practices (Y. Wang and Byrd, 2017). Wang, Kung and Byrd (2018) use an information lifecycle lens to further define BDAC as "the policies, processes, practices, services and tools used to align the business value of information with the most appropriate and cost-effective infrastructure from the time when information is created through its final disposition". Kiron, Prentice and Ferguson (2014) define BDAC as the ability to use data management, technology infrastructure and human capability to provide business insights for competitive advantage.

BDAC can be broken down into three dimensions and although literature terminology may differ, it has converged on three very similar capabilities to provide competitive advantage; big data analytics management capability (BDAMAC), big data analytics infrastructure capability and big data analytics talent capability (Wamba et al., 2017; Akter et al., 2016; Davenport and Dyché, 2013; McAfee et al., 2012). Socio-materialism suggests that the three dimensions are intertwined and do not work in isolation of one another (Akter et al., 2016). BDAMAC is an important aspect divided into four core areas, planning, investment, coordination and control that allow for better decision making to occur (Akter et al., 2016).

2.2.2. BDAC and Strategy Alignment

BDAC can be considered as a business model innovation due to the shift of the definition of a business model to that of a strategic management tool allowing for innovation to be incorporated into the business (Baldassarre, Calabretta, Bocken and Jaskiewicz, 2017); (Štefan and Branislav, 2016). BDAC is both an innovation and a driver of innovativeness but to be successful needs to be treated as a business model and be aligned to the business strategy (Teece, 2010).

BDAC and business strategy alignment is of increasing importance in business and in the literature (Davenport and Dyché, 2013; George et al., 2014). Strategic management is defined as "the full set of commitments, decisions, and actions required for a firm to achieve strategic competitiveness and earn above average returns" (Sheng et al., 2017). Big data is increasingly used as a strategic initiative and is becoming more critical in organisations. Big data literature with a strategic management lens is focused on how big data capabilities are structured and utilised in order to gain improved organisational performance through better and timeous long-term decision-making (Sheng et al., 2017).

Reacting quickly and strategically to the changes arising due to big data will create competitive advantage for organisations. Success in today's big data world will not be due to having more data but rather due to leadership teams that ask the right questions and act strategically on the big data insights (McAfee et al., 2012). Not enough is known about the impact of aligning BDAC with strategy on organisational performance. It is therefore important to understand this alignment and as such strategy with regards to big data initiative implementation will be investigated during this research project.

2.2.3. Understanding BDAC maturity level

The applications of BDAC are well documented in the literature and mention the potential of BDAC to improve organisational performance and create competitive advantage. However, in reality, these successes are often isolated with organisations failing to repeat their successes (LaValle et al., 2011; Wang, Liu, Feng and Wang, 2014). Organisations find it difficult to sustainably use BDAC to achieve value and improve organisational performance (Comuzzi and Patel, 2016; Elgendy and Elragal, 2016; LaValle et al., 2011). This is indicative of a non-mature BDAC. Niland (2017) posited that there was a direct relationship between successful and sustainable BDAC and BDAC maturity.

LaValle et al. (2011) categorised BDAC adoption into three levels, namely, aspirational, experienced and transformed. Aspirational organisations are the furthest from achieving sustained competitive advantage from their BDAC as these organisations are only focused on reducing costs and using BDAC for efficiency improvements on existing processes (LaValle et al., 2011). The next level is experienced, which is reached through successes in the first level. Organisations are looking to utilise BDAC for more than just cost reduction and start to focus on optimal ways to collect, analyse and implement based on big data insights (LaValle et al., 2011). The transformed level is where organisations want to be if they are to attain sustainable competitive advantage from their BDAC. These organisations now organise their other capabilities to align with the BDAC requirements and use BDAC to differentiate themselves in the market. This level of organisation has a big focus on customer profitability as well as further investment in their BDAC capability (LaValle et al., 2011).

A different maturity framework was presented in the literature by Mazzei and Noble (2017) but it also contains three levels. The first level is "Data as a Tool" is similar to LaValle et al. (2011) aspirational level in that it also represents organisations that mainly use BDAC for operational efficiencies to current core functions and value chains. Due to actions being mostly operational, this is where most organisations will find themselves because operational impacts are easier to achieve than strategic impacts (Mazzei and Noble, 2017). The second level is called "Data as an Industry" where the focus is on improving the processing and analysis of data with some development on future infrastructure as well as big data management software (Mazzei and Noble, 2017). "Data as a Strategy" is the top level where organisations will be focusing on using BDAC to influence strategic decision making and redevelop business models. This is the level an organisation needs to be at in order to use good data flow and data led decision making to produce innovation, thereby gaining competitive advantage and improved firm performance (Mazzei and Noble, 2017). Although the terminology is different and this model is slightly more detailed, both (Mazzei and Noble, 2017) and (LaValle et al., 2011) use similar tiering and criteria to separate their maturity levels.

Making the move through the tiers and into the top maturity level is difficult for companies and may be one factor contributing to organisations inability to convert BDAC into value and organisational performance.

2.2.4. BDAC and Organisational Performance

BDAC literature has become increasingly focused on an organisational studies lens in order to link BDAC to organisational performance. Within this literature, the BDAC alignment to organisational structure, culture, management, operations and functionality is examined (Sheng et al., 2017). Noblet et al. (2011) emphasise the importance of organisational culture of successful big data initiatives. BDAC is studied within the literature in relation to value creation, decision-making, competitive advantage and organisational performance as a whole. Economic value is often measured with an increase in profit or business growth (Günther et al., 2017). Competitive advantage is proven when it is demonstrated that the organisation outperformed its competitors both strategically and financially (Côrte-Real, Oliveira and Ruivo, 2017).

There have been an increasing number of studies looking at BDAC and its impact on organisational performance. These studies have yielded mixed results with some affirming the relationship between BDAC and organisational performance while others are not able to demonstrate an increase in value (Wamba et al., 2017). Time lags or lack of appropriate data have been listed as reasons for improved value not being demonstrated and many academics suggest that BDAC impact on organisational performance is mediated by a number of different variables.

Braganza et al. (2017) develops a business process for BDAC due to the increasing importance of effectively managing BDAC and Wang and Byrd (2017) looks at the relationship between BDAC and decision-making effectiveness in healthcare. A number of studies have emerged that focus on business analytics enabled business value improvements through theoretical lenses of information processing and RBT (Wang and Byrd, 2017). Kabir and Carayannis (2013) find that competitive advantage can be gained by having the right combination of people, tools, data and management within a supportive culture. Erevelles et al. (2016) investigated the impact of big data on various marketing activities and developed a framework to determine

when big data leads to competitive advantage. They concluded that strategic decisions led by big data insights are required if an organisation wants to fully leverage the value of BDAC. The effects of BDAC on firm performance for Chinese firms was conducted by Wamba et al. (2017) and Gunasekaran et al. (2017) attempted to develop a model for BDAC in the specific functional area of supply chain management. An organisation's strategy should determine the investment to be made into technology and big data, ensuring alignment of the BDAC to the strategic purpose (Wamba et al., 2017). Wang, Kung, Wang, et al. (2018) use the healthcare industry and claim to show a causal relationship between BDAC and business value. A data-driven organisation is one that not only focuses on technological understanding and implementation but can identify the strategic value of BDAC (Wang, Kung and Byrd, 2018). Vidgen et al. (2017) study the challenges in becoming a data-driven organisation. Caesarius and Hohenthal (2018) find that big data initiatives are more successful when efforts are coordinated by top management and pushed down to every level of the organisation. (Günther et al., 2017) propose that a way to realise value from big data is to iteratively realign practices, strategies and stakeholder interests.

Although research into big data has been growing and the above examples are just a few of the recent studies, there are gaps where research has not been done but is needed. The benefits that BDAC can potentially provide have been well established but how to realise those benefits practically has not been determined (Sheng et al., 2017). Also, many different theories have been used to generate the models and mediators for BDAC relationship to organisational performance but there is no converging model with consistently used antecedents and mediators that has emerged as dominant in the literature. This demonstrated the lack of maturity of this research and the need for more qualitative research to be conducted in order to determine the capabilities for the BDAC to organisational performance model to become more consistent. Some of the research conducted make theoretical links between BDAC and organisational performance but practical evaluation and qualitative in depth understanding of how and what aspects of BDAC are influencing organisation performance have not been done. Also, there is very little understanding of how organisations build successful big data capabilities (Gupta and George, 2016). This is the gap this research will try and fill.

2.3. Theoretical Underpinnings in the Big Data Literature

In most big data and BDAC studies in the literature, academics make use of one or more theories originating from strategic management theory. These theories include Knowledge-based view (KBV), Resource-based theory (RBT), Dynamic capability theory (DC), Practice-based view (PBV), management commitment, post adoption diffusion of innovation, absorptive capacity, technology organisation environment framework, sociomaterialism and Leavitt's (1965) diamond model for socio-technical systems.

Two sets of research use just one theory and these are less common in the literature. Wang, Kung and Byrd (2018) recently used a rare theory in the big data literature, called Practice-based view (PBV) to examines the historical development, architectural design and component functionalities of BDAC in the healthcare industry. They found five capabilities; analytical capability for patterns of care, unstructured data analytical capability, decision support capability, predictive capability, and traceability. The aim was to help the healthcare industry understand BDAC better with an improved ability to create data-driven strategies. Vidgen et al. (2017) use Leavitt's (1965) diamond model for socio-technical systems, which has four dimensions; organisation and management, people, process and technology. This model was used to study the challenges organisations face when trying to become more data-driven and they treat BDAC as a mediator between the data and the potential value that can be generated from actioning the insights.

Most of the rest of the literature uses three of the most predominant theories, often used collectively with each other or with another strategic management theory to provide a framework when utilising big data. These are Knowledge-based view (KBV), Resource-based theory (RBT) and Dynamic capability theory (DC). Braganza et al. (2017) uses all three in a research paper.

2.3.1. Resource Based Theory (RBT)

Resources and capabilities are the core components of the Resource Based Theory, which is based on the VRIO framework. In this framework the firm's performance is dependent on the firm's valuable, rare, imperfectly imitable resources which are properly organised (Akter et al., 2016). The former two traits provide competitive advantages while the presence of all four VRIO traits provides sustainability (Braganza et al., 2017). Resources can be physical, human, technological or reputational capital and tangible or intangible, with superior firm performance possible when the VRIO resources are simultaneously possessed (Gunasekaran et al., 2017).

RBT proposes that firms which possess scarce resources should use these scarce resources to gain competitive advantages (Erevelles et al., 2016). Braganza et al. (2017) voiced their concern over using RBT

as an underlying theory in big data literature, stating that RBT's assumptions are not true for big data and therefore the theory as it stands cannot be applied to big data.

RBT is commonly used when studying IT capability. This theory states that distinctive, valuable and inimitable resources will provide competitive advantage because a distinctive set of capabilities is difficult for other organisations to replicate and benefit from. The same is argued about differentiating IT assets that will deliver value in line with strategic objectives (Wamba et al., 2017).

2.3.2. Dynamic Capability Theory (DCT)

Braganza et al. (2017) suggests that dynamic capability theory is a suitable alternative to RBT for use with big data. The manner in which an organisation continuously reconfigures processes for the most beneficial outcomes is referred to as dynamic capabilities. An issue in the literature is that many examples refer to isolated big data successes, Dynamic capabilities is the theory that could help the literature move past this issue by providing the understanding on how to make big data initiatives repeatable and sustainable (Braganza et al., 2017).

Noblet et al. (2011) present a definition for dynamic capabilities as being those processes which provide the ability for reconfiguring a firm's resources to adapt to changing market conditions. Braganza et al. (2017) argues that the more frequently a firm is able to adapt itself, the better the chances of the firm achieving competitive advantages in the market place. It is furthermore stated that issues arise when management teams rely on expereince from past experiences instead of experimenting to learn and innovate quicker. This survival of the strongest philosophy quickly culls the ideas which prove to be ineffective as it is possible to rely on real time feedback and communication which allows the firm to make adjustments as more data comes from the system.

2.3.3. Absorptive Capability Theory (ACT)

Absorptive capacity is seen as a specific type of dynamic capability (Y. Wang and Byrd, 2017). Cohen and Levinthal (1990) first defined absorptive capacity as "the ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends" and claimed it was critical for innovativeness. This concept has gained increasing attention in the information systems research and in 2002, Zahra and George updated absorptive capacity by providing four constructs; Acquisition, Assimilation, Transformation and Application. Today the new, external information in the context of this study is big data and this updated theory is now becoming more prevalent in BDAC literature. This study will adopt absorptive capacity as the underlying theory by using the four constructs posited by (Zahra and George, 2002).

2.4. Big Data Capabilities and Success Factors

Big data capabilities and success factors are the requirements and prerequisites for a successful big data implementation in order for the potential of big data to be exploited. Different studies have identified capabilities. McAfee et al. (2012) and Davenport and Dyché (2013) describe three important capabilities required for a big data driven business in order to achieve organisational performance. These are people management, technology infrastructure and management. Management is important for organisational decision-making, technology is required to store, analyse and manage the data, and managing people to ensure the correct data science capability is important for the ability to properly analyse the data and achieve actionable insights (Wamba et al., 2017). Kiron et al. (2014) similarly focus on an organisational, technological and people aspect, referring more specifically to the capabilities being the analytical skills of the employees, analytics platforms and organisational culture, rather than management.

Wamba et al. (2017) go a step further and state that management, technology and people are second order dimensions and posit eleven first order capabilities specific to each of the three dimensions. They state BDAC planning, investment, coordination and control as four management capabilities required. The important technology capabilities are connectivity, compatibility and modularity while technical knowledge, technology management knowledge, business knowledge and relational knowledge are the four important capabilities required by the personnel. When these capabilities are complimentary and synergistic, they can bring about the desired organisational performance from big data initiatives (Wamba et al., 2017).

Another capability required to achieve firm performance is ensuring big data initiatives and BDAC is aligned to business strategy. This will ensure actionable insights are attained from the data to allow for the correct actions to be taken at the right time in order to achieve the organisational purpose (LaValle et al., 2011; Davenport and Dyché, 2013; George et al., 2014; Sheng et al., 2017). Braganza et al. (2017) bring attention to having a big data implementation process and how this can ensure the big data initiatives deliver on the potential benefits.

Gupta and George (2016) propose seven success factors of BDAC. Firstly, three tangible resources of data, technology and basic resources (time, investments), secondly two human resources of managerial skills and technical big data skills, thirdly a data driven culture and lastly intensity of organisational learning. These can be similarly grouped into management, technology and people (as with many of the literature sources mentioned above) as well as culture. Wang, Kung and Byrd (2018) similarly recommend training personnel in big data analytics and developing a data-driven, information sharing culture but add three more success factors for BDAC, namely; implementing big data governance in order to take advantage of organisational data resources to create business value, utilising the technology advancement of cloud computing and generating new business ideas from big data insight, which is more strategic than operational.

This research is a summary of what the literature are detailing as capabilities required for successful implementation of big data initiatives to achieve organisational performance. A summary of the capabilities can be found in Table 1 below, but it can be seen that there is a vast array of capabilities and combinations of capabilities being used to study the relationship between BDAC and organisational performance. New research is still being generated with new capabilities being tested and this list is therefore not comprehensive. Also, many of the studies are quantitative and the capabilities derived from strategic management theories. There is a gap in the literature for a qualitative study to determine the capabilities and success factors by getting practical insights from big data personnel. Although there are lists of capabilities in the literature, there is also a gap in understanding how organisations can create a successful and sustainable BDAC. This research study will aim to begin to fulfil this gap.

Table 1. *Summary of Big Data Capabilities from Literature*

Capability	Success Factors	Sources
Management	- BDAC planning, investment, coordination and control	McAfee et al. (2012); Davenport and Dyché (2013); Wamba et al. (2017)
People	- Analytical skills of the employees - Technical knowledge, technology management knowledge, business knowledge and relational knowledge - Managerial skills - BDAC training	McAfee et al. (2012); Davenport and Dyché (2013); Kiron et al. (2014); Wamba et al. (2017); Gupta and George (2016); Wang, Kung and Byrd (2018)
Technology	- Infrastructure and analytics platforms - Connectivity, compatibility and modularity - Data - Cloud computing	McAfee et al. (2012); Davenport and Dyché (2013); Kiron et al. (2014); Wamba et al. (2017); Gupta and George (2016); Wang, Kung and Byrd (2018)
Culture	- Data driven - Organisational learning - Information sharing	Kiron et al. (2014); Gupta and George (2016); Wang, Kung and Byrd (2018)
Strategy	- Alignment of BDAC and strategy - Generating new business ideas from big data insights	LaValle et al. (2011); Davenport and Dyché (2013); George et al. (2014); Sheng et al. (2017); Wang, Kung and Byrd (2018)
Processes	- Big data implementation processes	Braganza et al. (2017)
Basic resources	- Time - Investments	Gupta and George (2016)
Governance	- Across organisation	Wang, Kung and Byrd (2018)

2.5. Big Data Practicalities and Failures

Big data practicalities and failures are the challenges and factors contributing to big data initiatives not meeting the objectives and not achieving proposed benefits and improved firm performance. (McAfee et al., 2012) broadly list leadership, talent management, technology, decision-making and company culture as areas where challenges occur and lead to failure of big data initiatives.

More specifically, one of the main challenges organisations face is positioning BDAC as a strategic capability for sustainability, where many big data projects are not completed (Comuzzi and Patel, 2016). Some of the challenges can be technical in nature and are related to not having the correct infrastructure or systems, storage capacity, security etc. (Akter et al., 2016). The advancements in technology are making it easier for big data initiatives to occur and challenges are in general moving more towards a non-technical nature where data access, big data skills, personnel resistance, decision-making, management etc. are hindering the progress of big data projects (Wamba et al., 2017).

Frizzo-Barker, Chow-White, Mozafari and Ha (2016) found three main challenges; namely; lack of

appropriate skill sets and tools that prevent benefits from being realised, data privacy and regulation is increasingly challenging as more personal information is shared, stored and analysed, and organisational dynamics not optimally designed and working for utilisation of big data insights. A siloed culture will prevent the integration across departments and levels in an organisation required for successful big data project implementation (Comuzzi and Patel, 2016). LaValle et al. (2011) stated something similar but also added a lack of understanding on how to utilise the insights, lack of management focus, badly aligned business processes, unmoving organisational culture and organisations lack of understanding of their BDAC maturity as causes of failure to convert insights into organisational performance.

Inadequate organisational culture is also mentioned by Shah, Irani and Sharif (2017) to inhibit realising the full benefits from a big data initiative. Akter et al. (2016) mention that a misalignment between culture and capabilities, and the plan to act on insights is a major challenge to achieving goals of big data initiatives. Shah, Irani and Sharif (2017) agree, stating that the culture needs to be aligned with that of an organisation that wants to be innovative and change when data-based evidence produces insights that say a change is required. Shah, Irani and Sharif (2017) also mention that it is important to conduct structured assessments of employees to gauge their level of happiness and support with initiatives and changes occurring. Another inappropriate culture is one that follows strict rules given by management and leaves no room for innovation or collaborative thinking. (Comuzzi and Patel, 2016) also describe implementation complexity as a challenge, most notably when the initiative runs across divisions and levels in the organisation. Inadequate leadership is described by Akter et al. (2016) and LaValle et al. (2011) as a main reason for failure of big data initiatives to deliver on its promises. This occurs particularly at executive level where either no clear goal was set or initial by-in was not achieved or sustained support to deliver on the project does not occur.

Static organisations are a challenge for implementation of big data initiatives as these organisations do not have structures and processes in place to act on any insights and implement the changes required. This makes any changes slow and the dynamic nature required to constantly change and adapt based on findings is missing (Chen and Zhang, 2014). Gupta and George (2016) cite the lack of managerial support as a factor contributing to the failure of big data projects to deliver their promised benefits. They also mention that recruitment of talent with the right big data skills is challenging because these skills are not being taught at university.

Inability to convert the investment into a big data initiative into organisational performance can be costly and it is therefore important to understand where the challenges lie and what the risks are if all other capabilities are not aligned to the big data initiative needs. This study will aim to determine what some of the common big data challenges are facing organisations today.

2.6. Big Data Value and Innovation

Big data value and innovation refers to how big data is used to contribute to organisational performance through value creation and lists the benefits of big data initiatives and effective BDAC.

Big data has become more prominent in business and literature has attempted to explain the potential benefits of utilising big data. LaValle et al. (2011) describe how companies utilising big data to the benefit of their differentiation strategy are twice as likely to be a top performer than companies not utilising big data in their industry. Braganza et al. (2017) describes the benefit as potential for economic returns due to the better understanding and insights from the immense amount of data. Kabir and Carayannis (2013) mention big data's ability to improve strategic innovation as well as marketing and operations. LaValle et al. (2011) also proposed that big data was a source of innovation and Kabir and Carayannis (2013), LaValle et al. (2011) and Sheng et al. (2017) posit the benefit of using big data as a knowledge tool for better decision-making. Using big data to gain competitive advantage has been evidenced by Sheng et al. (2017), who mention big data's impact on improved customer relationships, lower management risk, improved operational efficiency and corroborate Kabir and Carayannis (2013) sentiment of more effective marketing and operational strategies. Sheng et al. (2017) also mention the value of being able to access and act on this data in a timeous manner.

Big data has already been used in many industries to bring about changes in business processes and therefore interest in deploying big data initiatives within organisations has increased significantly (Kabir and Carayannis, 2013). Academics such as Akter et al. (2016), Erevelles et al. (2016) and Wamba et al. (2017) have been exploring the benefits of big data for business.

The ability to use big data for decision making and in turn business strategy through BDAC was demonstrated by (LaValle et al., 2011). This led to the literature shifting a focus onto strategy-led BDAC which could be used to create sustainable business value. BDAC allows a company to be proactive and forward looking and BDAC is therefore a major differentiator for competitive advantage (Wamba et al., 2017). Wamba et al., (2017) demonstrated that BDAC is a vital organisational capability which directly results in positive

impacts on organisational performance and sustained competitive advantages, a sentiment echoed by Akter et al. (2016) and LaValle et al. (2011). The fluid nature and adaptability of BDAC results in value creation (Erevelles et al., 2016).

Saggi and Jain (2018) state that BDAC is useful for delivering insights and value, measuring performance and establishing competitive advantage. Wamba et al. (2017) mention the importance of BDAC for achieving improved business efficiency and effectiveness, higher operational potential and better strategic potential. An important benefit is the ability to better manage an organisation through an improved strategic lens and therefore BDAC greatly benefits improved decision-making within organisations. The insights from BDAC allow for better customer insights to be gained and therefore improved customer relationships are possible (Wamba et al., 2017). This can lead to better customer retention and acquisition.

Overall, big data initiatives and BDAC can lead to improved organisational performance through value creation, better strategic decision-making, gains in competitive advantage, efficiency gains, improved marketing and increased innovation. Although the breadth of benefits listed above sound amazing, realising them is more difficult. The literature tends to describe big data as having the ability to bring about these benefits but provides little detail as to how one might go about implementing the initiatives to reap the rewards. There is limited knowledge on the strategy, structure, management and capabilities required in order to make these initiatives successful and achieve improved organisational performance and value from the initiatives with the primary challenge for business's being how to derive this value from big data (Sheng et al., 2017). This understanding needs to be gained in order to improve confidence in big data capabilities because the use of technologies that generate data is only going to continue to grow significantly.

2.7. Conclusion

Big data and BDAC have become increasingly important for business as they can take the vast knowledge available to the company and turn it into business insight, organisational performance and sustained competitive advantage. Realising this potential is difficult and there is an increasing need to focus on how an organisation can utilise BDAC to its full potential and understanding what the key success factors are for Big Data initiative implementations.

3. Research Questions

To this end, this research asks the following three research questions:

1. What is the general understanding of big data and its current situation?
2. What capabilities are required in order to be successful at translating big data insights into organisational performance?
3. What are the biggest challenges/risks to converting big data insights into organisational performance?

Research Question 1: What is the general understanding of big data and its current situation?

It is important to establish the current situation of how organisations understand big data as well as what they use big data for and how they go about utilising big data. This will provide context to the state of big data within the industries and organisations in South Africa that are part of the research. Literature has revealed the many definitions of big data and there is no single definition for big data (Sheng et al., 2017). Literature describes big data in terms of three, five or seven V's (Braganza et al., 2017; Sheng et al., 2017; Erevelles et al., 2016; Gupta and George, 2016). Comuzzi and Patel (2016) definition of big data is the most relevant to the research objectives and states what the few higher-level business participants and consultants began to describe as their understanding, "the ability to harness information in novel ways to produce useful insights of goods and services of significant value and to extract new insights or create new forms of value". It will be established after analysis whether it is the most appropriate definition for this research. The literature also outline's the importance of developing BDAC and the common uses and ways of working with big data. This can be used as a baseline for comparison to see if this research agrees with the literature and if there is anything new that the research can add to literature. This will also establish what context needs to be successful for organisational performance.

Research Question 2: What capabilities are required in order to be successful at translating big data insights into organisational performance?

Once the context is understood it is then important to use the research to find what factors will allow BDAC to be successfully converted into organisational performance. The literature has presented a few quantitative models to try to determine these factors (Niland, 2017; Akter et al., 2016) but there is little in the

way of qualitative, in-depth insights gained from organisations and their real-life experience to determine what the best success factors to be apart of the quantitative models should be. This research question will aim to provide this missing insight.

Research Question 3: What are the biggest challenges/risks to converting big data insights into organisational performance?

Once the success factors have been established. It becomes important to understand the challenges and problems organisation have gone through whilst learning to develop their big data maturity. The literature has also identified challenges (McAfee et al., 2012; Wamba et al., 2017; Frizzo-Barker, Chow-White, Mozafari and Ha, 2016; LaValle et al. 2011) and the research identified challenges can be compared and contrasted to literature to determine if there are any new challenges that exist, either because environments are developing and/or the context of these organisations in their respective industries in South Africa creates different problems to face.

These research questions will be examined in the following paper of this journal, titled *"Success Factors of Big Data to Achieve Organisational Performance: Qualitative Research".*

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