The Effect of Big Data on the Quality of Decision-Making in Abu Dhabi Government Organisations

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Abstract One of the important research topics and areas that is attracting significant interest and attention globally is 'big data'. While big data contribute towards the quality of decision-making, it also assists in the development of and extending the knowledge in this area by harnessing available technology. This research presents and discusses the literature related to the quality of big data and its impact on the quality of decision-making. A descriptive methodology approach was also adopted by reviewing the literature of published and unpublished scientific research along with a survey in the form of a questionnaire involving participants from Abu Dhabi Police Agencies to collect their views and opinions in this area. The results from the literature review and survey led to proposing a theoretical, conceptual model according to the quantitative and numerical methodology. The findings of this research have revealed that the quality of big data predicts the quality of decision-making and that the quality of big data in Abu Dhabi Governmental Organisations (ADGO) plays a significant role in the quality of decision-making.

Keywords Big data · Information systems · Mediating factor, ADGO

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1 Introduction

1.1 Background to the Problem

Big Data consists of extremely large datasets which are analysed computationally to reveal significant patterns, trends, and associations, especially relating to human behaviour and other interactions. Big data is a term used to refer to the study and application of data sets that are so large and complex that traditional data-processing application software is unable to appropriately deal with them.

In recent years, the quality of data, and its use in effective decision-making has become a critical factor in driving the sustainability and growth of contemporary organisations. The decision-making process is typically reliant upon the quality and accuracy of the data, information, and knowledge [34, 36]. Data can be defined as a raw material and the input of any process whereas, information is the result or outcome of the processing process in the form of outputs that offer useful meaning and value. In 2011, according to the McKinsey Global Institute, bid data can be defined as a collection of data, big in size, exceeding the capabilities of traditional data through the collection, storage, processing, management and analysis of databases [22, 31]. Big data also contains a small fraction of organised information, although a large proportion is unorganised. The concept of big data and its benefits has quickly become a global reality.

There is no single definition of big data, as some definitions describe it as an outcome from the use of computers, mobile phones, communication devices, and Internet applications. The majority of people globally nowadays use mobile phones to make voice calls, send text messages, e-mail, and browse the Internet to purchase goods and services and pay via mobile payment systems via their credit cards. Notwithstanding, many people are continually browsing social networking sites, updating content, and posting messages (i.e., Twitter, Facebook, etc. [1, 9, 33]). All of this generates data and increases the volume of digital content being hosted and stored, which ultimately results in significant data revenues and challenges. The size, speed, and variety of data (i.e., data characteristics) are likewise increasing. The value of data is when it comes to searching for information and/or to extract data [2, 4, 5, 19]. However, big data is complex, overlapping, and it cannot be processed using a single tool like a database as the data is unstructured.

1.2 Problem Statement

Recently, big data has evolved to become a widespread [universal] and desirable phenomenon in administrative, economic and political fields (Maier and Markus 2013). Furthermore, given the rapid and modern advances and changes witnessed over the last few years, especially in Arab countries, it has become necessary to investigate the ways that countries have invested in harnessing the opportunities

associated with big data. Moreover, it is important to identify the anticipated benefits and to identify the challenges of this new technology. While the United Arab Emirates (UAE) is one of the leading countries that produce large amounts of data, the ability to harness this [big] data remains a challenge [37]. Therefore, the problem associated with big data is represented in several ways:

(a) Through the need to investigate the impact of big data on the quality of decision-making.
(b) To determine the most important and influential factors associated with the role of big data.
(c) To explore the influence of big data (in management information systems (MIS) as an intermediary), towards the quality of effective decision-making.
(d) To understand the benefits of the UAEs strategy to invest in big data.

The problem of this research can be surmised based on the scarcity of research in this field which has focused on optimising the investment of big data as an influencing factor with effective decision-making. The literature review undertaken in this study has revealed that many studies have confirmed there is a weakness in the optimal investment of big data by many companies, to support effective decision-making [6–10]. For example, in 2015, the study entitled, "Big data and Trial" reported that no clear model determines the relationship between big data and the impact on the quality of decision-making.

1.3 Research Contribution

The contribution and benefits of this study will not simply revisit the importance of big data and the extent of its complexity in different fields and applications that have been undertaken by previous scholars and researchers. Instead, this study explores the uniqueness of big data by studying its use and the investment made by other countries and resultant benefits. More importantly, this study will highlight the relationship between the impact of big data and decision-makers and the important factors that must be present in order to use the data effectively.

Accordingly, this study examines the application of big data in the context of government departments and in other fields in the United Arab Emirates (UAE). Moreover, to determine the various ways and approaches that the UAE has adopted as part of its investment strategy to use big data, by measuring the benefits and comparing to the experiences of other countries.

1.4 Research Objectives

This research aims to identify the factors that have led towards investing in big data by examining the impact and influence of big data on the quality of decision-making in government organisations in the UAE.

2 Literature Review

Hadoop is a distributed computing platform which has become quite synonymous with big data, and due to its high availability, expandability, fault tolerance, and low costs have become a standard for big data systems. However, Hadoop's Distributed File System HDFS storage system makes it quite challenging to face end-user applications (such as using a user's browser history to recommend news articles or products). Therefore, the more common practice is to send offline computing results to user-facing storage systems (UFSS) such as Redis and HBase. In 2018, Hadoop conducted a study to examine the organisational structure of big data by analysing several models for structuring and organising big data [3, 12, 37]. The goal of the study was also to conceptualise the available technology applications and programmes to serve the needs of big data and to organise these programmes based on their components and functions in organisational models. However, the reference structure in the document is illogical for analytically oriented storage areas, because search and performance capabilities rely heavily on the aggregation model and are not flexible enough for specific queries. Although, it can be an option for semi-structured data planning due to its potential performance and scalability in the online flow area.

Also, to store the flow of semi-structured events or data from internet weblogs a consistent model is required. For example, depending on how much storage is available, there may be a write/ write conflict, or there may be data platly loss if the master node in the master-slave model breaks down before publishing the data to any slave. This is ideal for the flow of workloads that are appended only, which usually occur in event logs. Also, it may be an option to store semi-structured data in the raw data archive. In the following sections, big data and the decision-making factors are discussed along with describing the various sub-factors that are associated with each.

2.1 Big Data Factor

Big data constitutes a wide range of large and complex data which is difficult to manage using conventional information systems (IS), given their database structure that processes data using traditional applications and programmes. Many of the challenges facing operators is the ability to access information, and the time required

relating to portability, storage, searching and transportation of data. Although, given the development of information technology (IT) over the last few decades, and the rapid emergence of the Internet, the demand for data applications has increased leading and similarly the need to analyse a broad range of data and their associated relationships. However, compared with smaller and separate groups of data, dealing with them has become quite complicated. Nowadays, big data is one of the most important sources of information for government and non-government organisations and has also become an important economic and valued source for countries as a catalyst for innovation. It is anticipated that big data will continue to become not only a vital source of information but the information will increasingly become more sensitive towards the security of countries. On the other hand, big data has enabled the discovery of commercial and legal linkages in which the applications that support big data help to combat crime and terrorism. Moreover, to determine the flow of security data in a timely and appropriate manner.

Big data includes clusters of data of vast sizes and storage areas that exceed the capacity of traditional software and systems in their ability to search and capture information in a very short time. Data management and processing within an acceptable time are pre-requisites for handling big data given the vast volumes of data that are moving continuously, which often makes it difficult to search and engage with the data. In most cases, the magnitude and size of big data requires enormous storage capacity which traditional storage media handling cannot cater for. Given this issue, the development of new systems and special tools to handle and manage big data will help to provide the means by which users can access and obtain the data quickly, accurately and with high efficiently (Snijders et al. 2012).

2.1.1 Data Quality

Big data has driven the demand for highly talented information management professionals in software development companies, such as Oracle Corporation, IBM, Microsoft, SAP, EMC, HP, and Dell. These companies have spent more than US$15 billion on software and data management software. In 2010, the software industry was valued at more than US$100 billion and rapidly growing by almost 10 per cent per annum; about twice the speed of the software.

According to one estimate, a third of the world's stored information is in the form of alphanumeric and static image data, the most useful form for most big data applications. This also shows the degree and magnitude of unused data (i.e., in the form of video and audio content). While many vendors offer ready-made solutions to cater for big data, industry experts recommend the development of internal solutions designed to manage and solve the company's existing problem(s), if the company has adequate technical capabilities.

The application and adoption of big data in government allows for cost-efficiency, productivity, and innovation, but not without its drawbacks or disadvantages. Data analysis often requires multiple parts of government (central and local) to work collectively to create new and innovative processes to achieve the desired results.

For example, in government, one of the important applications for big data in the scientific field is in the recording data for large helium collisions. There are about 150 million sensors that deliver data at a frequency of 40 million times per second. Further, there are approximately 600 million collisions of atoms that occur per second that require recording and analysis after filtering and sorting the data which must be 99.99995% accurate. Accordingly, big data technology plays a significant role in the accuracy of data and results.

2.1.2 Data Relevance

Big data is usually quite unstructured and messy, of varying quality and distributed to innumerable servers located worldwide. Regarding, big data, there is always a sense or general perception of the vastness of the data itself rather than its preciseness and detail. Before the advent of big data, analysis was limited to testing a limited number of hypotheses that were formulated before collecting the data. Leaving the data to talk, relationships that were not previously envisioned or evident gradually evolved. For instance, Twitter can be used to predict the performance of the stock market, and likewise, Amazon and Netflix offer products to consumers based on the feedback and ratings of tens of thousands of users. Likewise, Twitter, LinkedIn, Facebook creates a "social graph" of user relationships to show what users prefer.

Although big data will be based on the values developed and preserved globally in many cases as evidence, the data is not simply a re-enactment of old rules applied to new conditions, and therefore an awareness of the urgent need for entirely new quality of principles is needed. Big data has become an important element in the treatment and recognition of problems such as climate change, disease eradication, the creation of efficient governments and economic growth. However, through the emergence of big data, there are also many challenges imposed on organisations in order to be better prepared in harnessing the technology that will inevitably transform society, institutions and ourselves. Strategies have lost three main components that have long been used in privacy protection, namely; observation and approval of individuals, withdrawal, and ignorance. In fact, one of the most significant drawbacks of big data is that many users feel that their privacy has been violated.

Moreover, many organisations have dealt with the difficulty afforded by big data; interacting with data as an unfortunate reality, rather than viewing it for its real value. In fact, many people tend to view big data as an artificial [human-made] constraint developed by techniques over time. However, nowadays, the technical or technology environment has turned around 180 degrees. Although, there are still, and always will be, limitations on how much information can be efficiently managed, these will be less limited and restricted over time. Therefore, the criticism of the big data model can be seen from two respects. The first of which stems from those who doubt the implication of big data based on conventional or the same approaches, and second, is from those who doubt the way it is presently implemented.

2.1.3 Spread Data

Big data delivery is an exceptional technique to handle large volumes of data stored and received in a timely manner. A report by McKinsey (2011) proposed that to deal with big data requires a number of factors. These include information system operators, appropriate learning, authentication rule techniques, data classification, the practice of cluster analysis of the data stored, and data integration. Also, algorithms, machine learning technology, knowledge of sorting and natural language processing which handles the user. Also, the identification of data patterns, the rapid detection of abnormal evidence, digital signal processors, learning subject and non-subject to control, digital simulation and is automatic (Manyika et al. 2011). The challenge of handling significant amounts of data is not new. Historically, society has worked with limited amounts of data as the tools, organisation, storage, and analysis have been limited. Moreover, the information was filtered, relying only on the smallest part, in order to easily examine it.

Based on the 2013 Global Trends Study, improvements in supply planning and product quality provide the most significant benefits regarding large [big] manufacturing data. Notably, the data provides an infrastructure to facilitate manufacturing transparency, which is the ability to detect uncertainties in processes such as inconsistent components, performance, and availability. Moreover, predictive processing as a viable approach to near zero failure and transparency requires a vast amount of data and advanced forecasting tools for a systematic process of managing the data to gain useful information.

2.1.4 Data Storage

Most systems dealing with big data do not use relational databases (MPP) because they cannot store and manage large amounts of data. Moreover, these systems do not have the capability to monitor and load data of this magnitude, have no backup facilities, or use tables sufficient to cater for large [big] databases using RDBMS technique.

The data analysis programme DARPA (Defense Advanced Research Projects Agency) is one of the most important programmes used in evidence infrastructure rules for big data management. This technology first appeared in 2008 in the institutions of Anaj company claims where management responsible for data operations and analysis were unwilling to deal with the storage space required for the data, instead preferring slow direct storage spaces (DAS), starting with solid state hard drives (SSD), followed by Serial AT Attachment (SATA) hard drives of higher-capacity. The underlying architecture of the spaces associated with shared data storage are ineffective, slow, complex and are often expensive. Furthermore, the specifications of these devices do not cater for managing big data, which is characterised by high speed and efficiency nor do they allow for big data analysis and efficient system performance. However, the infrastructure designed specifically for big data needs to be affordable [37]. Accordingly, based on the information described above, it is evident

that the timely delivery of large amounts of data is one of the most distinctive characteristics of big data systems. Obviously, the cost of a storage area network (SAN) used in big data applications is significant compared with other storage technologies.

2.2 Factors of Decision-Making

Organisations rely on effective decision-making to achieve strategic objectives towards the growth and profitability of the organisation and shareholders and to solve the problems faced by the organisation (Nightingale 2008). Decision-making often involves the brainstorming of ideas and putting forward proposals and suggestions related to improving the operations of the organisation, in meeting its objectives. Furthermore, by identifying the necessary information needed and articulating the strengths and weaknesses of each idea or proposal, this helps to determine the most appropriate proposal and making amendments until reaching the most appropriate decision. This, therefore, enables the institution to achieve its objectives in the shortest possible time and perform its operations with the highest level of efficiency and effectiveness. The following section discusses the decision-making process and stages (Kutty 2007).

2.2.1 Problem Identification Accuracy

The problem identification stage is the initial stage that is undertaken in the decision-making process. This stage is undertaken to identify the actual problem or decision that needs to be made and the work required to resolve a particular problem. Notably, the size and nature of the problem will influence the process and time to resolve the problem in deciding. All interested parties associated with the decision-making process will be involved in the process to gain their input and different perspectives on the cause(s) of the problem (including symptoms and impacts) and identifying those parties impacted by the problem [13, 22]. The decision-makers during this stage identify the nature of the problem, its dimensions (scope) and the situation or circumstance which creates the problem. The importance of the problem should not be confused with the symptoms, causes and time to resolve the problem in order to make an effective and appropriate decision. System information (SI) is integrated into this process during the facilitation, determination, and identification of the problem. This step is often complicated by the implication that the problem is the existence of something that hinders the implementation of some task(s) or the achievement of objectives.

2.2.2 Information Accuracy

In understanding the problem, the accuracy of the information collected and analysed is important. This helps to identify the cause or reasons that have led to the problem and precedes the proposal phase. During this stage, suitable and practical alternatives and options are identified and examined. This requires data and information related to and linking to the problem to be available. Also, the capacity of decision-makers is crucial during this stage as they will be relying on the collected sources of information (and data) presented as information relating to the problem at hand. Accordingly, the information must be accurate and relevant in order for the decision-makers (or stakeholders) to compare, analyse and discuss any facts or figures to identify alternatives and options which will lead towards an appropriate decision. Therefore, in understanding the problem, they must also understand the reality of the situation or circumstance, by proposing alternatives to solve the problem.

2.2.3 Evaluation of Alternatives

The evaluation phase of alternatives is important in the decision-making process and is often considered as the most important stage as it will determine the nature of the decision that will be chosen from a range of alternatives. Importantly, this stage considers the outcomes from the previous stage; the alternatives, supporting factors, organisational policies, philosophy of the organisation, the potential of each alternative and timing. All these factors will constitute towards an effective decision being made and shortlisting of alternatives if necessary. Additionally, logical thinking, visualisation and predicting the outcome of the decision is paramount during this stage of the process. Evaluating alternatives helps in rating and ranking each alternative and shortlisting to compare the benefits and disadvantages of each alternative. Selecting the most acceptable and most appropriate alternative is also based on available standards, risk, and objectivity. Standards being the most appropriate in many instances.

The researcher of this study at this point highlights that fake participation by subordinates and specialists in this particular field depends on forecasting innovation. Notably, the number and type of alternative solutions depend on several factors; position of the organisation, the policies it applies, its material resources, the time available to the decision maker, the director's [and management's] decision-making attitudes and his or her ability to think logically and creatively, based on imaginative thinking, perceptions, expectations, and ideas.

2.2.4 Decision Accuracy

Decision-making processes need to be integrated and coherent with existing information systems in order for management to expand the level of knowledge of managers on the proposed decision(s) that will be made. The integration of information sys-

tems will importantly help to support the accuracy of decision-making [8–10, 15, 32]. Moreover, the allocated time to make and select a decision will influence the quality of the final decision in achieving the optimal result or best outcome to resolve the problem. Notably, decision-makers will also need to consider the implications of their decision based on the ability to implement the solution or change.

Also, from the analysis undertaken by the decision-makers, it will be evident in most cases as to what caused the problem, and what decision(s) need to be made to achieve the best results or outcomes. Furthermore, there are differences between the analysis of the problem and the decision made; decision-makers can solve the problem without resolution. Alternatively, a decision can be made without solving the problem as suggested by Cao et al. [16] as the analysis may reveal that the problem is moated outside the domain of the organisation's liability. In this case, decision-makers, do nothing apart from informing management of their intention. This kind of process is a trade-off between the available alternatives and choosing the most appropriate alternative according to the criteria and considerations.

3 Research Method

In this study, the hypothesised variables and their relationships in the model have been derived from the previous literature on the models and theories, along with the literature prescribed above. Figure 1 displays the proposed conceptual framework of the model.

An eight-item questionnaire was developed for this research, in line with existing literature in harnessing big data as a key factor in the quality of decision-making, using a multi-item Likert scale. The variables were measured using a Likert Scale; 5 = 'Strongly Agree' and 1 = 'Strongly Disagree'. An online and paper-based survey

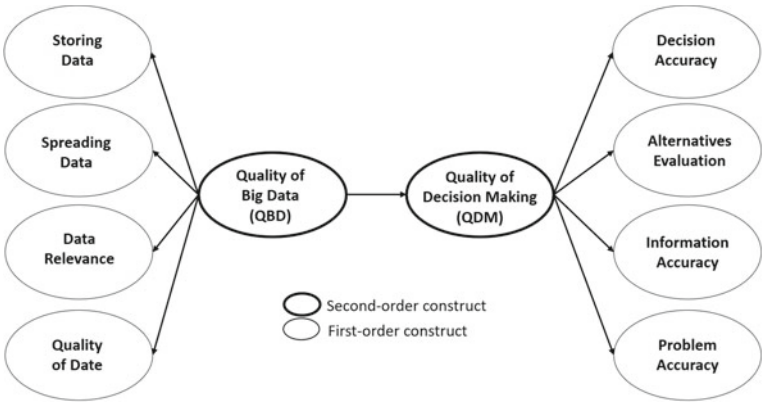

Fig. 1 Conceptual framework

in the form of questionnaires was used for the data collection process. Participants from Abu Dhabi Police Agencies participated in the survey.

4 Data Analysis and Results

AMOS statistical software was used to analyse the data. AMOS stands for analysis of moment structures and is an additional SPSS module used for Structural Equation Modelling (SEM), Path Analysis (PA), and Confirmatory Factor Analysis (CFA). It is also known as analysis of covariance or causal modelling software. Structural Equation Modelling-Variance Based (SEM-VB) was also employed to examine the research model [17, 30, 35].

4.1 Descriptive Analysis

Table 1 presents the mean and standard deviation of each variable in the current study. Each respondent was asked to indicate their opinion in completing the survey questionnaire. The quality of big data recorded a mean score of 4.093 out of 5.0, with a standard deviation of 0.674, indicating that the respondents agreed that the quality of big data within Abu Dhabi Governmental Organisations (ADGO), is high and decision-making is based on best practices. Also, the quality afforded by big data enabled ADGO to share this knowledge with other organisations.

The quality of decision-making recorded the mean score of 4.081 out of 5.0, with a standard deviation of 0.689, indicating that the respondents agreed that restructuring of resources and altering of organisational structures was important. Moreover, employees were aware that challenges will always come along, so employees persist in order to overcome them. ADGO performance was also viewed as being very high compared to how other companies or organisations in similar industries are performing. Indeed, ADGO's position in the industry was considered admirable and of a comparably high standard.

4.2 Measurement Model Assessment

All the goodness-of-fit indices exceeded their respective common acceptance levels as suggested by previous research. Therefore, demonstrating that the measurement model exhibited a good fit with the data collected. Therefore, the evaluation of the psychometric properties of the measurement model regarding construct reliability, indicator reliability, convergent validity, and discriminant validity could be proceeded with.

Table 1 Mean, standard deviation, loading, Cronbach's Alpha, CR, and AVE

Constructs	Item	Indicators	Loading (>0.5)	*M*	SD	α (>0.7)	CR (>0.7)	Ave. (>0.5)
Quality of big data (QBD)	QBD1 QBD2 QBD3 QBD4	The quality of data within an organisation Data relevance to the decision subject Spread data and availability Store and structure of data with firms	0.721 0.736 0.745 0.789	4.093	0.674	0.860	0.882	0.592
Quality of decision-making (QDM)	DMQ1 DMQ2 DMQ3 DMQ4	Problem identification Accuracy information Accuracy alternatives evaluation Taking decision	0.843 0.889 0.678 0.645	4.081	0.689	0.831	0.891	0.584

Note M Mean; *SD* Standard Deviation, α Cronbach's alpha; *CR* Composite Reliability, *Ave* Average variance extracted
Key QBD Quality of big data; *QDM* Quality of decision-making

Table 2 Results of discriminant validity by Fornell-Larcker criterion

	Factors	1	2
		QBD	QDM
1	QBD	**0.769**	
2	QDM	0.490	**0.764**

Note Diagonals represent the square root of the average variance extracted while the other entries represent the correlations
Key QBD Knowledge sharing; *QBD* Quality of decision-making

The values of all the individual Cronbach's alpha coefficients in this study exceeded the suggested value of 0.7 [29]. Furthermore, for testing construct reliability, the values of all the composite reliability (CR) exceeded 0.7 [21]. Furthermore, the values of all average variance extracted (AVE) exceeded the recommended value of 0.50 [23]. Table 1 shows that all items in this study had factor loadings higher than the recommended value of 0.5 [23].

Table 2 displays the results for discriminant validity using the Fornell-Larcker criterion. It was found that the square root of the AVEs on the diagonals (shown in bold) are greater than the correlations between constructs (corresponding row and column values), thereby indicating good discriminant validity [18, 20].

4.3 Structural Model Assessment

Figure 2 and Table 3 depict the structural model assessment. It is seen that the quality of big data significantly predicts the quality of decision-making. Hence, H1 is accepted with ($\beta = 0.484$, $t = 10.454$, $p < 0.001$). Twenty-three per cent of the variance in the quality of decision-making is also explained by knowledge sharing.

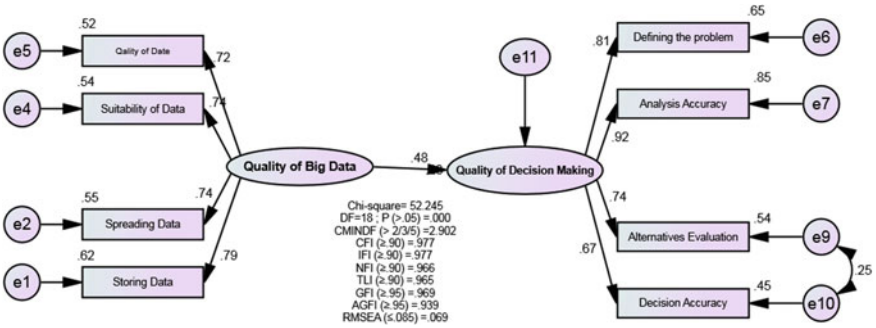

Fig. 2 SEM result

Table 3 Structural path analysis result

Hypothesis	Relationship	Std. beta	Std. error	*t*-value	*p*-value
H1	QBD → QDM	0.484	0.046	10.454	0.000

Key QBD Knowledge sharing; *QDM* Quality of decision-making

5 Discussion

The fundamental nature of decision-making is influenced by everyday activities coupled with organisational behaviour. This fact was established from the outset of this study. Accurate and effective decision-making are mandatory in all forms of business, drawing reverence from both internal and external organisational domains. Accordingly, the quality of accurate decision-making has become an ongoing concern for organisations globally, thereby creating the need for a much deeper understanding of the factors that contribute and that are needed in this area. Building on the premise that decision-making by management has often ended in abysmal failure, this has attracted the interest and attention of researchers to explore and explain the use of specific theories and paradigms.

6 Theoretical and Practical Implications

The implications associated with key theories and how these contribute towards the concepts and theories that underlie organisational uncertainty and best practice in decision-making are important to understand. This study paves the way for better understanding of how big data has become one of the most important factors in supporting decision-makers towards achieving more predictably their goals and objectives. The findings of this study reveal that the quality of big data has a significant effect on the quality of decision-making which therefore implies that the quality of big data is embedded in the quality of decision-making. Notably, this is because, in the quality of decision-making, employees do not just go along with what data is stored in the information system(s), but are instead, drivers of how to harness big data in a deferent manner. Contrary to the hypothesised relationship, the quality of big data is an insignificant predictor of the quality of decision-making whereas, the predictive effect was not a significant one. A study by Backhaus et al. (2010) presents key arguments that may explain this in which they argue that the quality of big data is key to organisational success in general and especially in the event of change. The impact of the quality of big data may, therefore, lie more in the quality of the decision-making process itself rather than the formulation of the quality of decision-making policy. Accordingly, this points to the quality of big data as an important tool towards the quality of decision-making (Johnson et al. 2008). As mentioned earlier, both the quality of decision-making management and the quality of big data predict the quality of decision-making. Also, the quality of decision-making management

may include directives aimed at employee tensions, which may improve the overall predictive effect of the quality of big data [11, 14, 22].

This study further helps to firmly establish the quality of big data as a key variable to consider in the implementation of harnessing big data to enhance and facilitate effective decision-making. The significance of the findings in relation to the concept of big data lies in the fact that it opens the door for academic research to further study these concepts as interlinked concepts. Notwithstanding, this study has added to the theory of the quality in decision-making regarding how complexities influence can it. The findings also make room for further critique in the field of quality decision-making and serve as a precedent for the development of hybrid models that illustrate the interrelationships revealed.

The present study has profound implications for the quality of decision-making that has currently been considered towards more sustainable institutional development. ADGO need to understand and know the impact of the quality of big data on the quality of decision-making, with the main rationale to help arrive at how management policies can assist towards the implementation of big data successfully. Notably, this can help in drawing attention from other organisations to build a successful model in the region.

7 Limitations and Recommendations for Future Research

A limitation of this study is related to the way the data was gathered which was cross-sectional rather than longitudinal. The longitudinal method might improve the understanding of the associations and the causality between the variables [24]. Therefore, future research should investigate the relationship between the variables by conducting cross-cultural studies as recommended by previous studies [25, 26]

8 Conclusion

In this study, the concept surrounding the quality of big data and decision-making was discussed, supported by performing a thorough literature review and survey of participants from Abu Dhabi Police Agencies. The relationship between the quality of big data and decision-making from the perspective of the theory of complexity can help management make well-informed and accurate decisions from an organisational viewpoint. A thorough discussion was evidenced by the application of these two areas in the management of complexity in the organisational context. Increasingly, big data in information systems is continuously being converted into meaningful information which is used and analysed by decision-makers to solve organisational problems. Therefore, the information must be reliable and accurate in order to identify alternative solutions and to make informed [quality] decisions. Consequently, the diversity of data sources, the information available, and alternative solutions to

problems can benefit the organisational decision-making process. This is supported by the conceptual model, hypothesising the variables and relationships.

Importantly, the nature of information and data held in information systems needs to be timely given that the information often corresponds to the type of decisions that are taken. Moreover, the dissemination of data is often in accordance and reliant upon the diversity of data formats. Therefore, big data stored and residing in databases needs to well structured and organised to facilitate the diagnosis of problems and solutions. With regards to the main research question which sought to investigate the relationship between the quality of big data and quality of decision-making, the findings revealed that the quality of big data predicts the quality of decision-making. This is also supported by the conclusion that the quality of big data in ADGO plays a key role in the successful quality of decision-making management. A final observation from this study related to big data implementation is that organisations should increase spending on research and development in order to increase organisational effectiveness and benefits associated with this technology [27, 28].

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