The Role of Organisational Culture in Adoption of Business Intelligence Systems in Ugandan Public Institutions

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Declaration

"I declare that this dissertation that I have submitted to Dublin Business School for the award of MSc Management Practice is the result of my own investigations, except where otherwise stated, where it is clearly acknowledged by references. Furthermore, this work has not been submitted for any other degree."

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Abstract

This research study was aimed at identifying the role of organisational culture in the adoption of business intelligence systems in Ugandan public institutions. A structured survey questionnaire based on the Organizational Culture Assessment Instrument (OCAI) by Cameroon and Quinn, and the Technology Acceptance Model (TAM) proposed by Davis (1989) and Venkatesh *et al.* (2003) was utilized to assess the dominant organisational culture and Business Intelligence Systems Adoption respectively. 106 questionnaires were completed by middle to top managers in four (4) Ugandan public organisation. The research study found that Ugandan public institutions predominantly exhibit hierarchy culture and in some organisations market culture. However, statistical tests to answer the research question revealed that organisational culture did not significantly influence BIS adoption. In addition, there was no difference between the culture types exhibited in relation to BIS adoption. Therefore, future studies may explore other factors that influence BIS adoption aside from organisational culture.

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1. Introduction

Business Intelligence is primarily concerned with the use of systems to perform analytical tasks to enhance the speed and reliability of decision-making, reduce costs and increase process quality and performance (Chung, Chen and Jr, 2005; Azeroual and Theel, 2018). To an increasing extent, Business Intelligence (BI) is becoming a driver for business success in many organizations as they move away from traditional sources of power such as hard assets, to leveraging intangible resources such as information, intelligence, intellectual capabilities, and knowledge (Negash and Gray, 2008). As firms seek to gain competitive advantage, the last decade has witnessed notable investments in Business Intelligence Systems (BIS) (Li, Hsieh and Rai, 2013). Despite this investment, not all firms have witnessed the same level of success in creating BI capabilities (Audzeyeva and Hudson, 2016).

Great potential has been realized by the private sector and huge strides have been taken in implementing and adopting business intelligence to enhance the critical decision-making function. However, in the public sector, this technological revolution remains largely untapped. Several public institutions in Uganda have implemented business intelligence systems for statistical and analytical ambitions. However, the exploitation of the business intelligence aspect of the process remains low in the public sector compared to the private sector. This can be attributed to several reasons, such as the politically oriented nature of public institutions, where decisions are affected by many stakeholders, therefore, they made are largely based on bargaining and compromise rather than rational analysis.

In the literature, (Twati and Gammack, 2006; Seng, Jackson and Philip, 2010; Senarathna, Warren, Yeoh and Salzman, 2014) organizational culture has been identified as one of the significant factors influencing information system adoption in organisations. Several

studies as outlined above based on the competing values framework have identified the adhocracy culture type to significantly have a positive influence, while the hierarchical culture type to considerably hamper the adoption of information systems in organisations.

Public institutions like business entities must embrace the BIS revolution to develop the ability to precisely and timely make in-depth analysis and informed decision that enhance service delivery that serves the public. This study seeks to investigate the relationship between an organization's current organizational culture using the competing values framework, and its success in BI adoption. The research question that the study aims to answer is **"Does organizational culture influence the adoption of Business Intelligence Systems in Ugandan Public Institutions?"** The following hypothesis have been formed from the literature to address this research question.

H1: The organisations that have an adhocracy culture type have positive BIS adoption.

H2: The organisations that have a hierarchical culture type have negative BIS adoption.

H3: The clan and market culture types do not have a significant correlation to BIS adoption

Although there is some research that examines the role of organizational culture in the general Information Technology / Information Systems (IT/IS) domain, there have been limited studies focused on the Business Intelligence component of Information Systems, let alone studied in the context of public institutions in Uganda. To contribute to the existing research, this project will add to the limited knowledge regarding public institutions and BIS adoption from an organizational culture standpoint. Research on public institutions and BIS adoption is limited and this study is primarily focused on the types of organizational culture that both positively influence and negatively hamper BIS adoption. Several public institutions in Uganda have adopted BI systems to support

decision-making and resource allocation. The knowledge obtained in this research may potentially benefit policy makers and give insight into how public institutions in Uganda can develop an organizational culture that fosters the adoption and use of BIS in the organization.

1.1. Literature Review

1.1.1. Literature Introduction

This chapter examines the literature and research associated with organizational culture and business intelligence. The section starts by exploring the organizational culture concept by covering; the definition, measurement of organizational culture, the Organisational Culture Assessment Instrument (OCAI) and organisational culture in the public sector. The chapter then explores the Business Intelligence concept addressing the definition, Business Intelligence capability, Business Intelligence adoption and Business Intelligence in the public sector. Finally, it examines the relationship between organizational culture and BI adoption.

1.1.2. Organizational Culture

1.1.2.1. The Concept of Organisational Culture

Culture is a concept that originates from social anthropology primarily used to categorize types of social relations and how they adopt cultural values and beliefs (Seng, Jackson and Philip, 2010). It remains a broad and complex concept to be defined in a single definition, which explains why numerous definitions by different scholars exist. Common elements may be drawn from the following definitions to conceptualize how it is commonly perceived. Kluckhohn (1951) cited by Hofstede (1980, p. 23) defines culture as a;

> "patterned ways of thinking, feeling and reacting, acquired and transmitted mainly by symbols, constituting the distinctive achievements

> of human groups, including their embodiments in artefacts; the essential core of culture consists of traditional (i.e. historically derived and selected) ideas and especially their attached values".

Even more succinctly , Hofstede (1980, p. 260) goes ahead to define culture as:

> "the collective programming of the mind which distinguishes the members of one human group from another".

In addition, House, Javidan, Hanges and Dorfman, (2002) defined culture as;

> "shared motives, values, beliefs, identities, and interpretations or meanings of significant events that result from common experiences of members of collectives and are transmitted across age generations."

It is evident that most of the definitions perceive culture as shared values, beliefs and experiences of a certain group. Furthermore, it is perceived as characterized by a range of indicators which incorporate external adaptation (environmental factors), internal integration (interpersonal factors) and associated assumptions regarding language, space and time (Schein, 1985; Schneider and Barsoux, 2003).

Influenced by the culture definitions, organizational culture (OC) scholars like (Schein, 2004, p. 17) borrowing the same essential features of culture defined organisational culture as used in this research as;

> "the pattern of basic assumptions that a given group have invested, discovered or developed in learning to cope with its problems of external adaptation and integration and that has worked well enough in the past to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think and feel in relation to those problems."

Basically, he perceives culture as something learned and passed on to new members. Deal and Kennedy (1982, p. 4) have summed it all up as "the way things are done around here".

Important to note, Hofstede, Hofstede and Minkov (2010) suggest that unlike other concepts of culture studied by anthropologists, organisational culture is exhibited mostly in practice than values. They argue that while values are acquired by a person early in life, practices are learnt through social interactions with others at school or work. Hence, organisations do not develop equally deep and rich socially acceptable conceptions of culture like say national culture.

Schein (1990) suggests that culture can be perceived at three awareness levels, that is: artefacts, espoused beliefs and values, and the underlying assumptions as illustrated in figure 1. Beyond the visible manifestations of culture such as artefacts and rituals which are only symptoms of culture, he argues that culture is defined by the cognitive, invisible components which form the underlying culture. Therefore, interpreting a group's culture will require extended exposure to the underlying components otherwise outsiders may make wrong assumptions regarding an organization's culture if they only focus on the visible manifestations (Schein, 1994).

Figure 1: Three Levels of Organizational Culture

Similarly, Sackmann (1991) using the iceberg model of culture also makes a distinction between the visible components which are only "the tip of the iceberg", from the invisible or cognitive components of culture lying below the surface. Overlapping Schein (1994), she also argues that there are two limitations to interpreting culture

based on the visible manifestations alone: first, current visible artefacts may only represent past underlying beliefs, and secondly visible artefacts that are shared by different organisations might have a different meaning in the context of the underlying beliefs.

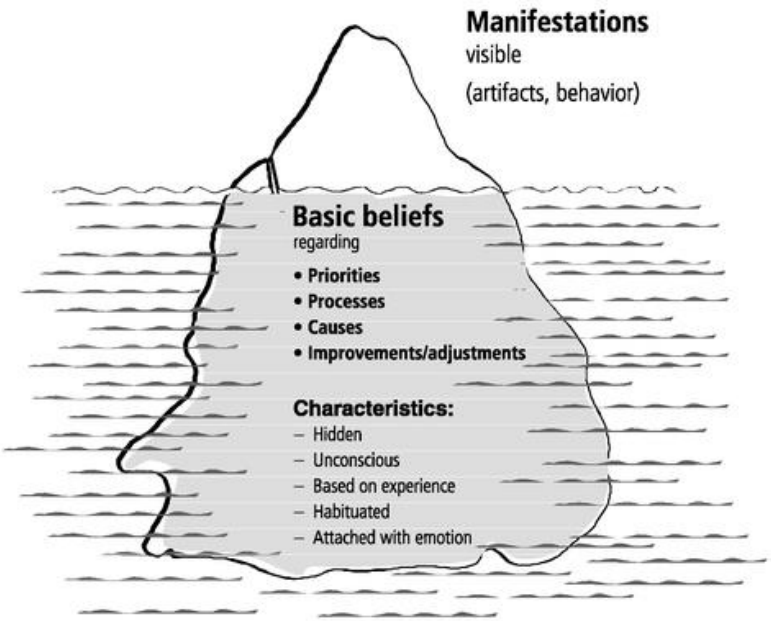


Figure 2: Sackmann's Iceberg Model of Culture. Source: (Sackmann 2002, p.27)

1.1.2.2. Measuring Organizational Culture

Despite the inherent complexity of the concept of organizational culture, every organization is defined by a particular culture. Several cultural studies have identified different dimensions and measurements to diagnose culture in any organization. Whilst varying instruments have been developed and used to measure organisational culture, their overall conclusions are quite similar. The most popular approaches to measuring organizational culture in Information Technology/Information Systems (IT/IS) research will be explored in this section.

a. Hofstede's Six Dimensions of Practice

Hofstede (2011) has developed a model that is widely used and defines six dimensions representing any organization's culture; process-oriented vs results oriented,

employee-oriented vs job oriented, parochial vs professional, open system vs closed system, loose control vs tight control, and normative vs pragmatic. The table below illustrates these dimensions further.

Table 1: Hofstede's Framework for Measuring Organizational Culture. Source: (Hofstede, 2011)

Dimension	Description
Process oriented vs results oriented	Process oriented culture is governed by technical and bureaucratic routines whereas results-oriented culture is led by a common concern for outcomes.
Employee oriented vs job oriented	Employee-oriented culture assumes a big responsibility for the members' well-being, while job-oriented culture assumes responsibility for employees' job performance only and nothing more.
Parochial vs professional	The parochial members derive their identity from the organization for which they work, while the professional people identify primarily with their profession.
Open system vs closed system	Refers to the familiar internal and external way of communication, and to the ease with which outsiders and newcomers are admitted.
Loose control vs tight control	Deals with the degree of formality and punctuation within the organization.
Normative vs pragmatic	Describes the flexible or rigid dominant way of dealing with the external environment especially with customers.

b. Grid and Group Cultural Theory

Douglas (2007) developed the Grid and Group Cultural Theory to understand the types of cultural diversities among African tribes. The theory defined social relations by two dimensions – Grid and Group. Douglas' (2007) grid refers to the degree to which an individual's life is defined by externally imposed instructions such as age, rules, traditions, regulations and seniority. While Group refers to the degree to which one's social position is absorbed in and sustained by group membership such as belong to a religious sect. Four cosmologies or ways of life result from the grid and group theory – fatalism, hierarchism, individualism and egalitarianism. Fatalism in relation to IS adoption will encourage values of apathy and incompetence, reluctant to adopt

technology and doubt around the value of technology adoption. Hierarchism will consist of control and power characterized by formal communication and defined power structures. Individualism embodies autonomy and individualism affording success to the risk taker. Egalitarianism fosters fraternity and teamwork which will see trust and equality encouraged.

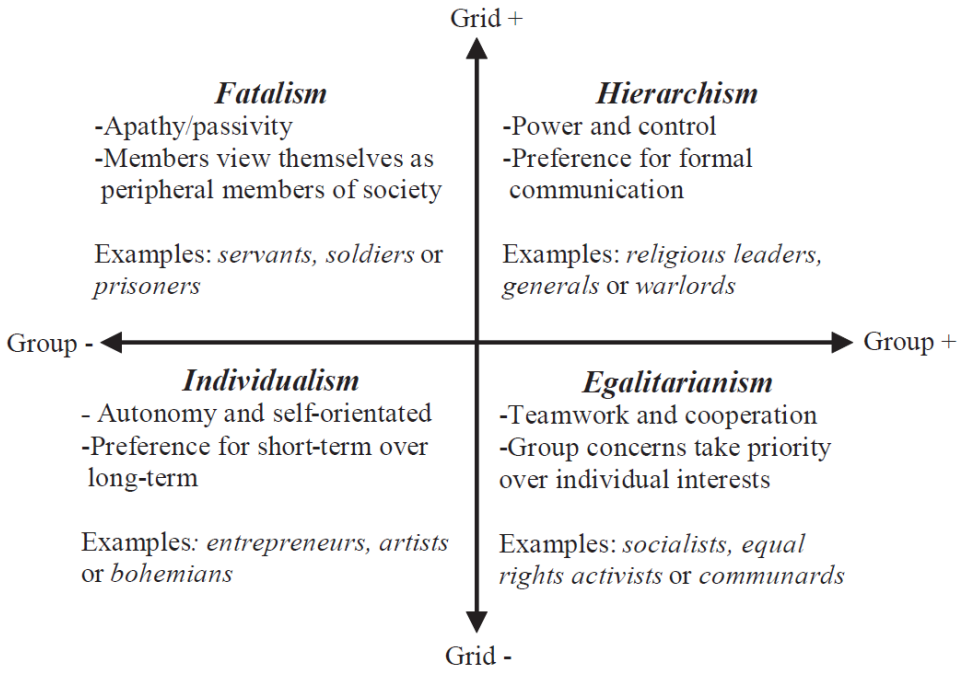


Figure 3: Grid and Group Cultural Framework

c. Competing Values Framework

This model is gaining popularity in IS research (Jackson, 2011). Originally created by Quinn and Rohrbaugh (1983), it was intended to help identify the values that are essential to effectiveness in an organization. However, extending their work, Denison and Spreitzer (1991) developed a more specific model that was based on two dimensions. Firstly, the flexibility-control dimension showing the degree to which an organization emphasizes change and stability; flexibility representing elasticity and change, while control represents rigidity and stability. Secondly, the internal-external dimension to highlight an organization's focus on internal activities and the external environment; internal practices emphasizing commitment to internal improvements,

while the external focus emphasizes adaptation to the external environment (Cameron and Quinn, 2011). Four quadrants are formed from the two dimensions (see figure 4) each identifying an organizational culture types with unique attributes. The culture types are; group (clan), developmental (adhocracy), rational (market) and hierarchical culture. Important to note, Denison and Spreitzer (1991) make an important assumption that effective organization will not embrace one type but rather merge the four cultural types to varying degrees.

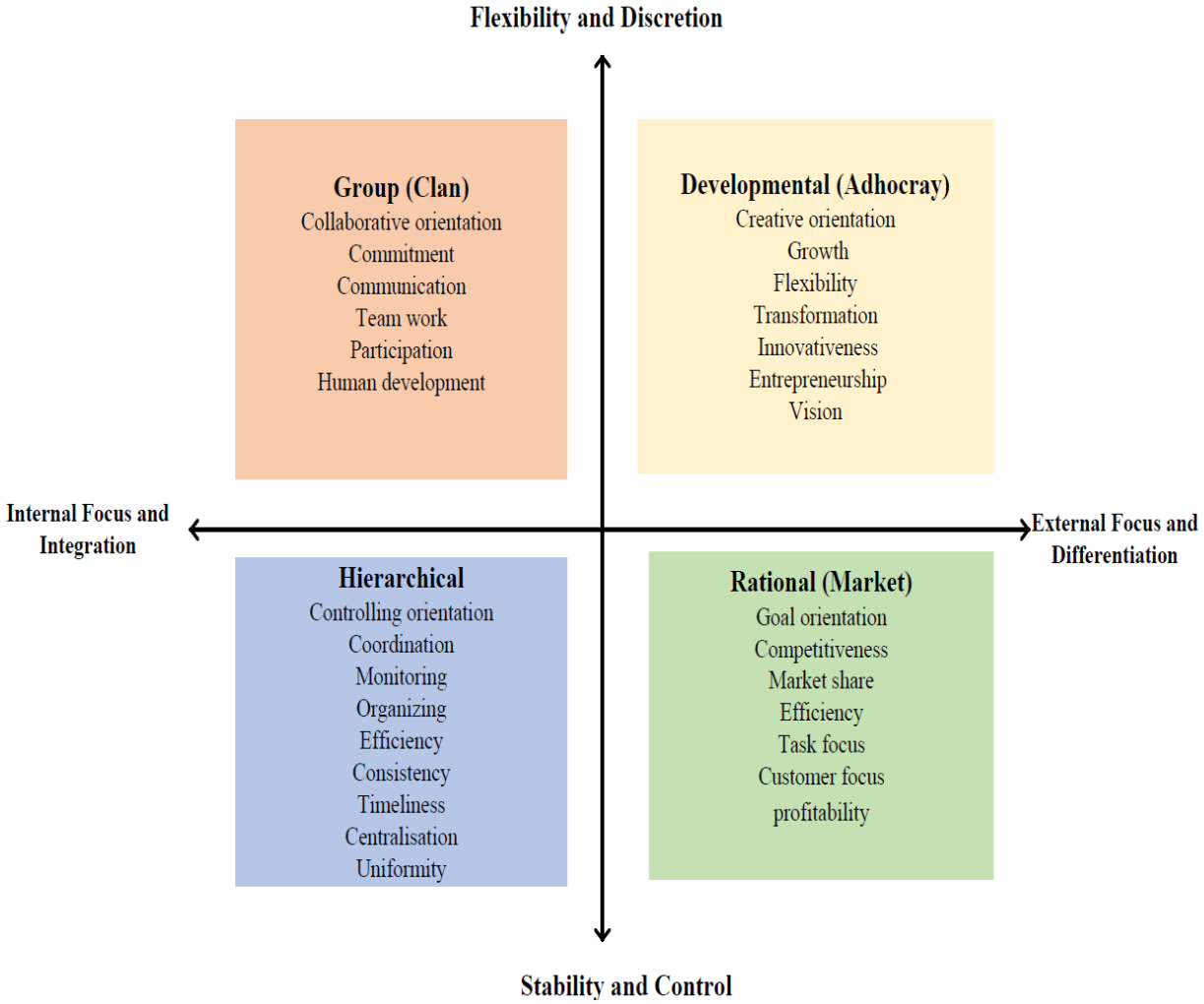


Figure 4: The Competing Values Framework. Source: (Cameron and Quinn, 2011, p. 53)

The characteristics of the four (4) culture type from Cameron and Quinn (2011).

Clan Culture

This culture creates a friendly work environment where people are sociable and can share personal information, much like a family. Employees think of their leaders as mentors and even parent figures. Loyalty and tradition hold the organisation together and commitment levels run high. The organisation emphasizes human resource development as well as unity and morale. Success is defined by being customer centric and people focused. The organisations attach value to teamwork, participation and consensus.

Adhocracy Culture

This culture is considered dynamic entrepreneurial and innovative where employees are willing risk takers. The organisation on the other hand also encourages personal initiative and autonomy. The leadership is visionary, innovative and open to taking risk. Research and innovation are the glue that hold the organization together. The organisation is driven by getting ahead of the competition with cutting edge products, services and new knowledge. The long-term focus of the organisation is rapid development and acquiring new resources.

Hierarchical Culture

This workplace is very formalized and structured with workflow controlled by procedure and policies. Leaders are viewed as good organisers and coordinators that are efficiency oriented. It is essential that the organisation is smoothly run with a long-term focus on stability, effectiveness and smooth functioning. The organisation is held together by formal rules and policies, and success is based on dependability in delivery, clear scheduling and low cost. Emphasis is placed of job security, proper planning and homogeneity.

Market Culture

The organisation is results driven and as a result people are highly competitive and goal focused. The leadership in turn is hard driving, producers, advanced aggressive and demanding. Winning in the market is the overall focus of the organisation, with long term emphasis on competitiveness and achievement of planned goals and targets. Success is determined based on reaching the highest market share and penetration.

Table 2: Summary of the Characteristics of the Culture Types. Adapted From: (Cameron and Quinn, 2011)

Characteristics / **Culture**	**Leader type**	**Value drivers**	**Theory for effectiveness**	**Quality strategies**
Clan	Facilitator, mentor, team builder	Commitment, communication, development	Human development and participation produce effectiveness	Empowerment, team building, employee involvement, Human Resource development, open communication
Adhocracy	Innovator, entrepreneur, visionary.	Innovative outputs, transformation, and agility.	Innovativeness, vision and new resources produce effectiveness.	Surprise and delight, creating new standards, anticipating needs, continuous improvement, finding creative solutions
Hierarchical	Coordinator, monitor, organizer.	Efficiency, punctuality, consistency and uniformity.	Control and efficiency with appropriate processes produce effectiveness.	Error detection, measurement, process control, systematic problem solving, quality tools
Market	Hard driver, competitor, producer	Market share, goal achievement, profitability	Aggressive competition and customer focus produce effectiveness.	Measuring customer preferences, improving productivity, creating external partnerships, enhancing competitiveness, involving customers and suppliers

Each culture type has its own strengths and limitations, therefore, there is no ultimate “best” organizational culture. Cameron and Quinn (2011) do not endorse a single ideal culture, but rather argue that each culture must be aligned to an

organization's vision, values and strategy in order to gain organizational effectiveness. Notwithstanding, certain culture types or a mix of culture types maybe better than others for particular activities. For example, adhocracy culture has been posited in the literature as being favorable for adoption of new innovations and change.

1.1.2.3. Organizational Culture Assessment Instrument

Based on a theoretical model developed by Quinn and Rohrbaugh (1983) called the Competing Values Framework (CVF), Cameron and Quinn (2011) developed a reliable instrument known as the Organizational Culture Assessment Instrument (OCAI) for measuring the prevailing organizational culture in an organization. The instrument was developed based on effective organisations and the values embedded in their culture. The tool is administered as a questionnaire to measure six (6) dimensions of organizational culture namely: 1. Dominant characteristic, 2. Organizational leadership, 3. Management of employees, 4. Organizational glue, 5. Strategic emphases, 6. Criteria of success. This tool helps organisations identify their organizational culture from the onset, the reasons it needs to change and the direction it should go. The OCAI has frequently been used widely in several organisations to effectively measure and compare different organizational cultures (Fralinger and Olson, 2011).

1.1.2.4. Organisational Culture in the Public Sector

Organisational context in the organisational change process is critical in order to align change management strategies to an organisation's goals (Kanter, 2003). Therefore, better understanding of the organisational culture in the public sector is essential for improved strategic outcomes. (Parker and Bradley, 2000). For this study, the public sector will be defined as "those parts of the economy that are either in state ownership or under contract to the state, plus those parts that are regulated or

subsidized in the public context" (Flynn, 2007, p. 2) They are aimed at meeting social and environmental goals, and they operate in commercial and noncommercial sectors (MacCarthaigh, 2007).

The traditional public administration model is characterized by a system of rules and procedures, structured hierarchies, and formalized decision-making processes (Parker and Bradley, 2000). Stability and control are essential to this model. Earlier on, Weber and Mills (1946) described this model as bureaucratic, rule enforcing, and composed of members with specialized technical knowledge of implementing the rules and procedures. Furthermore, public organisations unlike private organisations are driven by political forces as opposed to market controls. Their objectives, structures and processes are determined by central bureaucratic authorities or are mandated by law (Cole, 1988). Because of their public accountability nature, they are faced with conflicting interests from multiple interest stakeholders, which has led to unclear objectives and goals, in addition to hampering public sector managers ability to drive their organisations (Day and Klein, 1987). For these reasons, public organisations have overlooked developmental and rational characteristics of culture. They are not oriented towards adaptability, change and taking risk which is consistent with adhocratic (developmental) cultures, or productivity and efficiency which is consistent with market (rational) cultures. (Parker and Bradley, 2000)

However, recent decades have witnessed a push for public sector change in developed countries, influenced by the contemporary environment of economic instability and the need to cut costs. Deficiencies of the traditional bureaucratic model which is rules, procedure and stability oriented have motivated the need to shift to alternative administration models (Parker and Bradley, 2000). There has been a push for an orientation towards change, flexibility, innovation, efficiency and productivity

(Orchard, 1998). Reforms that promote employee participation as a way of gaining organizational commitment have also been supported (Williams, 1992).

The push to "reinvent government" as it is called, is premised on the idea that government efficiency and effectiveness depends on adoption of private sector best practices. The turbulent economic milieu which is fundamentally due to extensive globalization is the basis for pushing for flexibility and responsiveness in the public sector in order to cope in the changing environment and enhance service delivery (Valle, 1999; Parry and Proctor-Thomson, 2002).

Regarding the four culture types of the competing values framework, successful organisations tend to balance between the four cultures rather that exhibit a particular dominant culture (Howard, 1998), which dominant culture in the case of public institutions is primarily hierarchical culture. Notwithstanding this observation, earlier studies by Kotter and Heskett (1992) and a number of other studies on organizational change have isolated the adaptive culture as the optimal culture. They refer to organisations that encourage and support innovation and flexibility as having an adaptive culture. Kotter and Heskett (1992) suggest that long term superior performance can only be achieved by developing an organizational culture that helps in adaption to a rapidly changing environment.

Although the adaptive culture has been successful in the private sector, other researchers suggests that there are significant implications to fully adapting the public sector to private sector techniques. Scholars like Theobald (1997) state that the needs for the private and public sectors are not the same. He argues that the structures in the public sector maintain service standardization, while the flexibility of the private sector would compromise these standards leading to unethical practices. He concludes that a structured culture is more ideal for the public sector as opposed to an adaptive culture.

To harmonize both positions, a high breed between the two has been proposed to create a best fit, by taking into consideration the limitations, responsibilities and opportunities of distinct organisations (Parry and Proctor-Thomson, 2002).

1.1.3. Business Intelligence

1.1.3.1. BI Definition

Business Intelligence is primarily concerned with the use of systems to perform analytical tasks in an effort to enhance decision-making, reduce costs and increase process quality and performance. Several definitions for Business Intelligence have been proposed, and perhaps the first mention of it was by Luhn (1958) when he defined business intelligence as

> "the ability to apprehend the interrelationships of presented facts in such a way as to guide action towards a desired goal."

Later on in what was considered a visionary definition of BI and has been widely used (Power, 2007), Dresner (1989) as cited by (Nijaz, 2009, p. 19) defined BI as

> "a set of concepts and methodologies to improve decision making in business through use of facts and fact-based systems."

This definition emphasized data analysis, reports and query tools that add value to data and make it actionable. It focused on the intelligence garnered from analyzed information rather than just the tools and technologies that generate it.

However, there was a definition shift from Dresner's (1989) vision of business intelligence towards more IT-centric definitions focused largely on tools and technology. Some of the most popular are; Loshin's (2003, p. 6)

> "the processes, technologies and tools needed to turn data into information, information into knowledge, and knowledge into plans that drive profitable business actions."

In another definition, Moss and Atre (2003, p. 4) refer to BI as

> "an architecture and a collection of integrated operational as well as decision-support applications and databases that provide the business community easy access to business data." The tools and technologies outlined in the two definitions all do play a role in facilitating business intelligence, but they are not the intelligence itself (Wells, 2008).

Fuld (1994) illustrating the lifecycle of intelligence creation uses the following example to show how data is converted into information, then the information is analyzed to create intelligence. He argues that data, information and intelligence are not the same thing and that they can lead to very different conclusions.

Table 3: Intelligence Lifecycle. Source: (Fuld, 1994)

Concept & Definition	Application in business context
Data: Scattered bits and pieces of knowledge (numbers, or scattered data)	• 1990: "The Dun & Bradstreet report reflected that the competitor had 100 employees." • 1993: "One of the sales reps passes the competitor's plant and spots only 30 cars in the parking lot."
Information: A pooling of these bits of knowledge	A subsequent Dun & Bradstreet report shows that the competitor has lost business.
Analysis: Distilled information	After gaining more operational information about the competitor it appears that the competitor is highly efficient, exceeds standards and has become a world class facility.
Intelligence: The implication that will allow you to make a decision.	The competitor would make a good acquisition candidate, its lean and mean structure will be a good fit with our current operations.

Based on this backdrop, the following definition by Wells (2008) as cited by (Popovič, Hackney, Coelho, Jaklič, 2012, p. 729) can be proposed as the next-generation definition of business intelligence:

> "the ability of an organization or business to reason, plan, predict, solve problems, think abstractly, comprehend, innovate and learn in ways that

> increase organizational knowledge, inform decision processes, enable effective actions, and help to establish and achieve business goals."

Therefore, intelligent businesses are the ones that create the BI capabilities as outlined in this definition.

1.1.3.2. Business Intelligence (BI) Capability

The BI capability concept is derived from IT capability, where IT capability represents the

> "ability to mobilize and deploy IT based resources in combination or co-present with other resources and capabilities" to enhance performance (Bharadwaj, 2000, p. 171).

Similarly, BI capability may be defined as

> "IT-enabled, analytical capability for improving decision making, firm's performance, and adoption to changeable environment" (Olszak, 2016).

Consequently, BI capabilities are instrumental in enabling organisations transform business models as well as discover and adjust to unstable environments resulting into organizational transformation.

BI systems have several qualities that make them distinct from other types of Information Systems (IS) (Popovič *et al.*, 2012) such as; BI systems warrant unique efforts to generate interest since it mainly targets the managerial user. It also requires different use incentives since its use is commonly voluntary, therefore its users may want to see the advantages of its use. Lastly, unlike other Information Systems that focus on reducing costs or increasing operational efficiency, BI focuses on creating managerial efficiency and competitive advantage. Thus the mechanism of creating BI capability varies from that of creating the capability of other information systems (Kulkarni, Robles-Flores and Popovič, 2017).

1.1.3.3. BI Adoption

The IS literature fully recognizes the significance of BIS-enabled information on decision making especially for organisations in very competitive environments (Popovič *et al.*, 2012). This paper focuses on highlighting how business intelligence benefits can be maximized post the implementation stage. While there are crucial differences between BIS and other IS in many ways, majority of BIS studies have regarded BIS as a form of IS; supporting decision making at a higher level unlike operational IS. Therefore IT/IS adoption frameworks applied to assess a firm's level of IT/IS adoption can be and have been applied to BIS studies.

Technology adoption is a process that begins with user's awareness of the technology, followed by acquisition, or implementation and finally ending with the embracing and full use of technology by the user. Previous studies on IT adoption have used various theoretical approaches and have focused on both the individual and organizational elements that influence IT adoption. For the individual context, majority of the literature (Sonmez, 2018) has utilized the Technology Acceptance Model (TAM) proposed by Davis, (1989) and Venkatesh, Morris, Davis and Davis (2003) to investigate individual knowledge and attitudes toward BI adoption. The organisational context has been explored by both researchers and practitioners by the prominent use of the TOE framework developed by Tornatzky, Fleischer and Chakrabarti (1990) and the DOI framework developed by Rogers (1962)

The original TAM was derived from Fishbein and Ajzen's (1977)Theory of Reasoned Action (TRA), and was developed to particularly explain the individual acceptance of any information technology system. It further highlights underlying linkages between perceived usefulness and perceived ease of use as the two variables

among others that are especially important in influencing actual system usage (Hou, 2014). Davis (1989 p. 320) defines perceived usefulness as "the degree to which an individual believes that using a particular system would enhance his or her productivity." This means that users are more likely to use a system if it can enhance their performance. Perceived ease of use is defined as "the degree an individual believes that using a particular system would be free of effort."

Central to TAM is the notion that an individual's acceptance of technology is influenced by their behavioral intention, which is in turn influenced by their perceived usefulness and perceived ease of use of the technology. (Wu and Tsai, 2006). Behavioral intention refers to the extent a user makes deliberate plans to use or not to use a system. In addition, if users perceive that a technology is useful and easy to use, they develop a positive attitude towards it (Lee, Cho, Gay, Davidson, Ingraffea, 2003). In other words, high levels of perceived usefulness and perceived ease of use create good attitudes which lead to intentions to use (Lucas Jr and Spitler, 1997). In summary, actual system usage, is determined by behavioral intention, attitude, perceived usefulness and perceived ease of use of the system (Park, 2009).

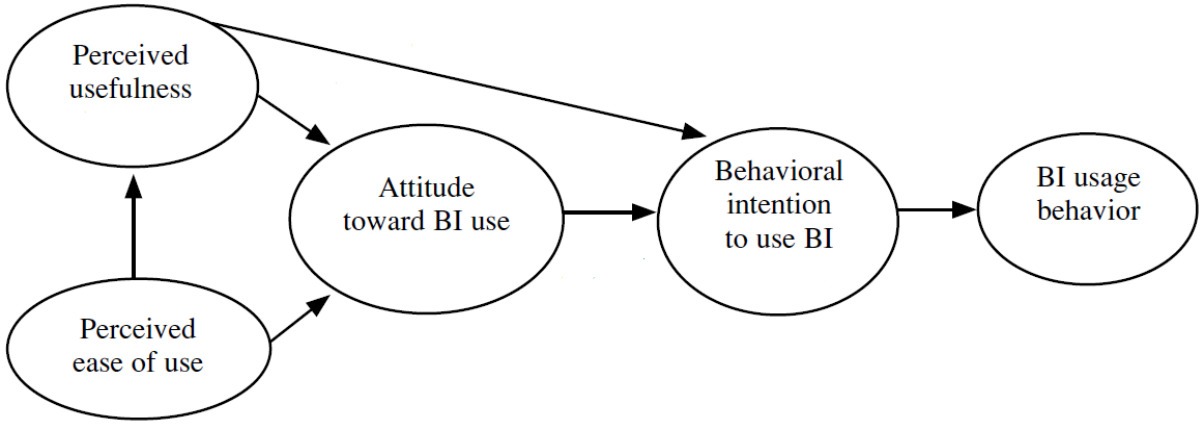


Figure 5: The TAM Model. Source: (Hou, 2014)

1.1.3.4. Business Intelligence Systems Adoption in the Public Sector

Across multiple domains of business, Business Intelligence has been the leading investment priority technology-wise globally. The shift towards advanced computer processing has led many businesses to transform their business processes by investing more in sophisticated equipment for processing rather than manufacturing. This has changed the business space and situated information as a key success factor (Wowczko, 2016).

The government-run institutions world over are seeking to get on board with this technology revolution in order to leverage the numerous benefits of information processing afforded by business intelligence. This enables them to meet their primary mandate which is to deliver services to citizens on time and budget (Wowczko, 2016). Public institutions in developing countries like Uganda are increasingly rolling out IT/IS systems commonly referred to as E-government projects in order to enhance public service delivery (Cordella and Hesse, 2010).

Currently, weak information and control systems have enabled poor service delivery, corruption and power misuse by public workers. It is essential for senior public officials to monitor performance and control service delivery in order to meet the public's needs. (Heeks, 2002; Hartley and Seymour, 2011). This can be achieved by improving decision making processes required for service design and service delivery (Boselli, Cesarini and Mezzanzanica, 2011). However, in the public sector, these decisions are largely driven by political pressures, social norms and culture, in such a way that decisions are often compromised in order to comply with the opposing interests (Wowczko, 2016).

In such a setting, competent leaders may create managerial effectiveness by implementing intelligent technologies to support decision making. While great potential has been realized from these technologies in the private sector, it remains largely

untapped in the public sector. This may be attributed to the fact that government driven environments are nonprofit oriented and noncompetitive (Wowczko, 2016). Furthermore, it's important to note that the public and private sectors are characteristically distinct in terms of objectives, information needs and especially decision makings processes. The public sector decision-making process which typical starts with the definition of objectives is centralized attracting interest from various stakeholders, who may put the interests of their constituents before the decision itself (Bozeman and Pandey, 2004). However, the transparency of the decisions made increases the need for clear objectives.

Service delivery improvement requires special attention to reducing costs and improving service quality in terms of effectiveness and efficiency. The former has to do with meeting objectives while the latter is concerned with resource allocation with minimal waste (Halvorsen *et al.*, 2005). To achieve this, service processes may be amended, and information quality improved to meet strategic information needs. Business Intelligence, therefore, can be employed to aid in the analyzing and packaging information stocks and flows into actionable insight to create strategic intelligence (Lönnqvist and Pirttimäki, 2006).

A number of public organisations have implemented systems that integrate content from disparate data warehouse for statistical and analytical ambitions. However, the exploitation of the business intelligence aspect of the process still remains low in the public sector compared to the private sector. This can be attributed to several reasons highlighted by (Nutt, 2006) such as; private sector managers are more inclined to analysis based budgetary decisions while the public sector will pursue consensus with stakeholders. Legislative directives that emphasize service delivery of information gathering on new service delivery trends. Lastly, public sector organisations have various aims which may be controversial and vague affecting performance outcomes.

Numerous challenges still exist along the BI adoption path of the public sector such as missing and hard to collect intelligence data which limits availability of alternatives in the decision-making process. However, pressure for real time information on the people, and the need to enhance service delivery with limited resources, as well as the significant reduction in the cost of BI technologies in recent years has reduced the barriers BI implementation.

1.1.4. Organizational Culture and BIS Adoption

Compared to all the other factors that influence IT/IS adoption, culture is the most difficult to segregate, define and measure (Hasan and Ditsa, 1999). Emerging literature (Seng, Jackson and Philip, 2010; Abousaber and Papazafeiropoulou, 2011; Al-Dmour, Nweiran and Al-Dmour, 2017) is highlighting the significant role that organizational culture plays in the success or failure of IT/IS adoption and also considers organizational culture as a critical intangible resource in achieving competitive advantage. This section explores the literature that highlights how organizational cultures influence the implementation of Information Systems. Not much research explores specifically the relationship between organizational culture and BIS adoption, which is why general IT/IS literature is used here.

Based on the Competing Values Framework (CVF) culture types, Senarathna *et al.* (2014) explore the organizational culture and e-commerce adoption correlation in SMEs in Sri Lanka. They find that the adhocracy culture is significantly and positively expected to drive e-commerce adoption. On the other hand, hierarchy culture is significantly and negatively prone to hamper ecommerce adoption. Correspondingly, a study by Twati and Gammack (2006) exploring the impact of organizational culture on the low IT/IS adoption in the oil and banking sectors of Lybia, found that both sectors significantly exhibited a hierarchy culture but also had low technology adoption rates. Another study

by Al-Dmour, Nweiran and Al-Dmour (2017) also re-echoes Senarathna *et al.* (2014) findings that adhocracy culture and hierarchy culture have enabling and hampering effects on technology adoption respectively.

Furthermore, the Senarathna *et al.* (2014) research study reveals that clan and market culture types were found to have an insignificant impact on e-commerce adoption, which is confirmed by Al-Dmour, Nweiran and Al-Dmour's (2017) study. Conversely, a study by Abousaber and Papazafeiropoulou (2011) on the impact of organisational culture on WiMAX adoption in Saudi Arabia by SMEs found that clan culture was exhibited as the predominant culture among the technology's adopters. They opine that this could be because organisational culture is not static. Generally, organisations tend to start in the clan culture, then adhocracy culture, then market culture and eventually hierarchy culture (Cameron and Quinn, 2011). They therefore suggest further investigation to determine the period of time since the SME's inception. Nonetheless, the study found that WiMAX was still not widely used by SMEs, emphasizing the fact that clan culture remains unfavourable for technology adoption.

Some studies like Twati and Gammack (2006) and Abousaber and Papazafeiropoulou (2011), there were no significant dissimilarities among organisational culture types of the organisations studied. Both research studies engage with the fact that there were other factors that influenced technology adoption that were beyond organisational culture alone. They suggested looking into other sources of data for detailed examination in instances where differences in adoption were not solely due to organisational culture, or adoption had partially resulted despite the predominant culture.

Al-Gahtani (2004), in a study on Saudi Arabian organisations suggested that how individual's perception on IT is affected by other organisational culture characteristics such as age, education level and gender. He also advocates that the nature of an institution affects its intention to adopt IS innovations, for example he confirmed that public sectors organisations are not inclined to IS adoption. The public sector is of interest to this study because it tests relationship between organisational culture and business intelligence in public institutions in the Ugandan context.

Twati and Gammack (2006) in agreement with other studies have stated that societal culture has an influencing effect on organisational culture. Therefore, dissimilarities in organisational culture types among institutions, they suggest might be a result of societal shared values and beliefs that are common to the particular society in which the institutions are positioned. This in turn is likely to influence who individuals in this society will reach to new changes and innovations.

Jackson (2011) in a study combining Martin's (2001) three perspectives on culture, that is; integration, differentiation, and fragmentation with Douglas' (2007) grid and group cultural theory, proposes that a combined theoretical approach affords an enhanced understanding of the relationship between organizational culture and IS adoption. This is because the limitations of one approach are rounded out by the strong points of the other. Using this combined approach in the study it was found that culture was not static but was dynamic and continuous. The study also showed that culture progressed across the three perspectives in a successive rather than synchronized manner. Similarly, the grid and group cultural perspective represented culture as progressing from egalitarianism, then subgroup conflict between hierarchists and fatalists and finally cultural ambiguity. Furthermore Jackson (2011) found out that this sequential cultural change was triggered by various factors such as introduction of new

technology, organizational restructuring, changes in leadership, redefined roles which may have a positive or negative impact on technology use.

Seng, Jackson and Philip (2010) examine the cultural issues that influence the adoption of IT systems by all stakeholders in two Malaysian public sector organisations. The study was based on the Grid and Group cultural theory by Douglas (2007). They found that both organizations followed a hierarchical approach to technology adoption, however, organization A had limited top management championship in the use of technology and the managers themselves did not use it. While in organization B, top management prioritized technology deployment and considered technology critical to success. However, similar to organization A, a power domination environment was created by a hierarchical approach where top management was concerned that the introduction of a technology would usurp their power and thus resisted it. Therefore, hierarchical approach has been identified by several studies as having both positive and negative impact on IS adoption.

Seng, Jackson and Philip (2010) also discovered that organization A with a high fatalism approach had an environment that hindered the adoption of IT systems and its employees were unwilling to adjust to the use of IT systems despite recognizing its importance. Yet the low influence of fatalism in organization B fostered willingness to change organizational environment and hence eager to use IT systems. Similarly, Jackson (2011) also observed that fatalists were passive and unwilling transition from there established routines hence hampering technology adoption

Seng, Jackson and Philip (2010) also found that organization A lacked the enabling attributes of individualism whereby its members were only allowed to use internet for one hour per day at lunchtime resulting into complications with deploying IT

systems. On the other hand, organisations B encouraged members to propose innovative ideas and the organisations policy valued IT skills in recruiting new staff. In contrast, Jackson (2011) found that individualism due to its unconstrained nature created difficulties in adopting IS projects. He found that the dark side of individualism - encouraging corner cutting, rule breaking, and cheating led to the user champions putting their interests before the rest hence ignoring user IT concerns. Jackson (2011) however warns that other contextual issues may affect IS adoption such as bureaucracies, big workloads, competing priorities and struggling for inadequate resources within an organization.

1.1.5. Literature Conclusion

Literature relating organizational culture to BI systems adoption was not readily available, so general IS literature was consulted given that Business Intelligence Systems are categorized under Information Systems. Organisational culture has been identified as a significant factor in the adoption of information systems, and literature admits that many information systems implementation projects fail because human factors are neglected. Information Systems literature recognizes that certain types of organisational culture do have impact on IS adoption. Adhocracy culture type was found to positively influence IS adoption, while hierarchical culture type had a negative impact on IS adoption in organisations.

Different models have been developed to identify organisational culture, and they are used extensively in the literature. Several models have also been developed to test Information Systems adoption at both the individual and organisational level. Based on the literature, three (3) hypotheses will be developed to test the impact of the four culture types on the adoption of Information Systems in Ugandan public sector

institutions. The OCAI tools will be used to test organisational culture while the technology acceptance model tool will be used to test BI adoption.

2. Methodology

2.1. Methodology Introduction

For any research, methodology is one of the most critical aspects, therefore, the most ideal methods must be selected (Blaxter, 2010). This section will present the research design and methodology of the study which is appropriate for conducting this kind of research. A detailed description of the research philosophy and approach will be followed by how the sampling was done, and the data collection methods were used in the study to answer the research question. Furthermore the data analysis process is stated, followed by a consideration of the ethical concerns.

2.2. Participants

In order for samples to be representative, quantitative research uses larger sample sizes than qualitative research (Sale, Lohfeld and Brazil, 2002). In this study, by means of targeted sampling, four (4) public sector organisations that were expected to have adopted BIS were selected. All the institutions that were selected, although mandated by government through an act of parliament, one (1) of the participating institutions was a quasi-government organization. This means that it has both public and private business characteristics. Authorization to conduct this research was secured from the executive offices of the respective institutions (see appendix 2), and an email was sent out by the HR departments to all key participants notifying them of the study being conducted.

The respondents who held middle or top management positions in their organisations were chosen based on two reasons; Firstly, management is essential to the creation and communication of organizational culture by expressing desired attitudes, values and behaviours (Schein, 2004). Secondly, Business Intelligence Systems are designed to support high-level decision making, therefore, they are typically used by management, who also play an important role in championing their usage across the organization (Popovič *et al.*, 2012). Targeting expert informants was to increase the accuracy of the information collected.

In the sample, approximately 21.6 percent of the total respondents were female. Concerning age, 37.7 percent of the respondents were between 25-34 years old, 42.4 percent were between 35-44 years old, 15.1 percent were between 45-54 years of age, and only 4.7 percent were between 55-64. In terms of educational level, approximately 61.3 percent had a master's degree while the rest held a bachelor's degree. With regard to the position held in the institution, majority of the respondents held middle management positions at 77.3 percent, 20.7 percent held senior management positions, and just 1.9 percent of the executives could be reached.

2.3. Research Design

2.3.1. Research Philosophy

In undertaking a research study, according to Saunders *et al.* (2015) the research philosophy is the initial layer of consideration in the research design, and its essential to conceptualize it early on in the process. The research philosophy is defined as "a system of beliefs and assumptions about the development of knowledge"(Saunders *et al.*, 2015). From the epistemological perspective of research philosophy, the positivist assumption was explored for this study. The purpose of research in positivist philosophy is to predict results, test a theory, or find the strength of relationships between variables

or a cause and effect relationship, in this case, a relationship between organisational culture and business intelligence adoption. It is based on the view that only the scientific method is the basis for true knowledge, and therefore applies the scientific method to study human behaviour (Johnson and Onwuegbuzie, 2004). The research philosophy chosen also influences the choice of methods used to tackle the research questions (Rosenberg, 2012). As such, the positivist philosophy usually adopts quantitative methods.

The literature in the area of organizational culture and business intelligence research is flooded with the traditional positivist quantitative approaches. Therefore, in keeping with previous research, this study adopted the positivist quantitative approach which is the preferred method in cultural studies in the event that the researcher desires to avoid intensive methods due to time limitations, invasiveness, human resources and organizational policy (Scott *et al.*, 2003).

2.3.2. Research Approach

A deductive research approach was adopted for this study. According to (Saunders, Lewis and Thornhill, 2009) this approach starts with a theory (questions, hypothesis), and is typically predictive of the outcome at the start of evidence collection. The deductive process starts with what is known from the existing literature of a particular subject, a hypothesis is formed and empirically tested, and then either accepted or rejected (see figure 6) (Bryman and Bell, 2007). The primary research question for this study is "Does Organisational Culture Influence the Adoption of Business Intelligence Systems in the Public Sector of Uganda?" Following the findings from the literature review, the types of organisational culture based on the Competing Values Framework (CVF) that came out prominently as influencing Information Technology/Information Systems (IT/IS) adoption were adhocracy and hierarchical culture types. The previous studies found that the adhocracy culture positively affected

organisational culture, while the hierarchical culture considerably hampered BIS adoption. Market and culture were not reported to have any impact on the adoption of technology in the literature, Therefore, the following hypothesis were formulated and tested on public institutions in Uganda.

H1: The organisations that have an adhocracy culture type have positive BIS adoption.

H2: The organisations that have a hierarchical culture type have negative BIS adoption.

H3: The clan and market culture types do not have a significant correlation to BIS adoption

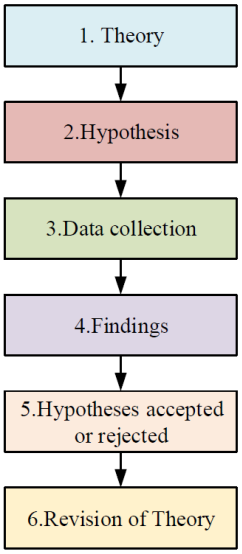


Figure 6: Deduction Process. Source: Bryman and Bell (2015, p. 23)

2.3.3. Research Strategy

According to (Bryman, 2008), a research strategy is the plan employed to answer research questions in a study. There are two strategies that are agreed upon in the literature namely; quantitative and qualitative (Saunders *et al.*, 2015). The quantitative strategy is used to study the relationship among variables in order to test objective theories. This research study tested the relationship between organisational culture and

business intelligence adoption using quantitative methods. With the help of a structured quantitative instrument, the variables were measured and the data was analysed by means of statistical methods (Creswell, 2013). In order to reflect the philosophical position and research approach previously chosen, the questionnaire survey was employed for data collection. The survey strategy facilitates the collection of a lot of data for a big sample space at a low cost (Hair, 2014).

Organisational Culture was the independent variable in the research question and was measured using an instrument developed by Cameron and Quinn (2011) called the Organisational Culture Assessment Instrument (OCAI). The tool was used to assess the prevailing organisational culture in each participating organisation. The dependent variable - Business Intelligence adoption, was assessed using the Technology Acceptance Model (TAM) tool proposed by Davis, (1989) and Venkatesh *et al.* , (2003). The tool was adopted and appropriately altered to investigate how decision makers influence BI adoption.

2.4. Materials

As previously mentioned, this study used the quantitative approach, therefore, a structured questionnaire survey was used for data collection. A self-administered online questionnaire with an average completion time of approximately 15-20 minutes was administered to participants through a popular dedicated online platform called SurveyMonkey. Online questionnaires were ideal for this study because they afford time-efficiency, convenience for the respondents and easy data entry and analysis (Evans and Mathur, 2005). A total of 150 questionnaires were administered, of which 106 questionnaires were fully completed, affording a completion rate of 70.6%. Validation rules were embedded into the online questionnaire to ensure data quality, and as a result, all the completed surveys were fit for data analysis.

According to Bourque and Fielder (2003), there are numerous benefits to adopting standard questionnaires that were previously developed and used. The following reasons are the basis for their argument; these tools have been used and tested for reliability and validity, this replication informs a researcher's methods of analysis, instructions to respondents have been identified and confirmed, and results from previous studies can be used for comparison and verification. Therefore, a structured questionnaire based on similar instruments in the literature was developed, because it is the most commonly used way to collect the required primary data in the literature. The research instrument was divided into three parts; the first part assessed organizational culture based on the Organizational Culture Assessment Instrument (OCAI), the second part assessed the individual's intention to use BI based on the Technology Acceptance Model (TAM).

2.4.1. Organizational Culture Assessment Instrument (OCAI)

The OCAI of Cameron and Quinn (2011) (appendix 1) one of the most popularly cited instruments in the literature (Twati and Gammack, 2006; Senarathna *et al.*, 2014) was used to measure the prevailing organizational culture in the participating organisations by assessing their shared values, norms and work approaches (Heritage, Pollock and Roberts, 2014). The instrument (see appendix 1) comprised 24 questions divided into 6 dimensions each with four statements (Cameron and Quinn, 2011). The 6 dimensions reflected were; dominant characteristics, organizational leadership, Management of Employees, Organizational Glue, Strategic Emphasis and Criteria of Success. Each of the four statements described one of the four (4) culture types i.e. clan, adhocracy, market and hierarchy. Participants were asked to divide 10 points among the 4 alternatives depending on how closely an alternative reflected the respondent's organization. Respondents assigned higher points to alternatives that were the most similar to their organizations.

All questions in this section of the instrument were mandatory, meaning that respondents could not leave them blank. Respondents were also required not to use decimals in rating the questions. In-built into the online tool were validation rules to ensure that a respondent could not enter decimals or proceed to the next section until all the questions had been rated and ensuring that all the four (4) statements in each dimension summed up to 10.

The questions from the OCAI were replicated and used in this research study without alteration because all questions were deemed ideal for assessing organizational culture in the context of public institutions in Uganda. These previous studies confirm the validity and reliability of the OCAI in IT/IS adoption literature (Abousaber and Papazafeiropoulou, 2011; Senarathna *et al.*, 2014; Al-Dmour, Nweiran and Al-Dmour, 2017). In these studies, the Cronbach's alpha was used to measure reliability, and all the values exceeded 0.7 which is an acceptable score according to Hair (2014). Therefore, the tool was considered acceptable for the study.

2.4.2. Technology Acceptance Model (TAM)

To measure BI adoption intention which is defined in this work as the user's behavioral intention to use BI for their work in the organization, questionnaire items based on the technology acceptance model (TAM) by Davis (1989) and Venkatesh *et al.* (2003) was used (appendix 1). The particular questionnaire used for this study was adapted from Bach, Čeljo and Zoroja's (2016) study, and it included 13 items measuring three dimensions of BI adoption:

- Perceived Usefulness (4 items)
- Perceived Ease of Implementation of BIS (perceived ease of use) (5 items),
- BIS Implementation (behavioural intention to use) (4 items)

Sonmez (2018) reported in a study that by order of importance; perceived usefulness, perceived ease of use and behavioral intention to use, were the major elements for promoting BI adoption in the capital markets. The participants were asked to score the items based on a five-point likert scale ranging from 1 = "Strongly disagree" to 5 = "Strongly agree". In the study by Bach, Čeljo and Zoroja (2016), the internal validity of the tool was assessed.

2.4.3. Attitudes to BIS implementation

The 9 items of both perceived usefulness of BIS and perceived ease of implementation of BIS were combined to assess attitudes to BIS implementation. The 9 items of the scale were subjected to a reliability analysis of which the Cronbach's Alpha was 0.755, indicating that the scale was reliable according to Hair (2014). Only one item was removed from the scale *(Company has adequate financial resources for BIS implementation)* because its Corrected Item-Total Correlation was 0.143. According to guidelines provided by Field (2013) the minimum acceptable Corrected Item-Total Correlation value should be at least 0.3. In addition, deleting this item significantly increased the Cronbach's Alpha (0.787), yet if any of the other items were deleted, the Cronbach's Alpha would be lower than 0.755. The scale for attitudes toward BIS use was therefore made up of 8 items with a Cronbach's Alpha of 0.787. The 8 items that were included in the scale are shown below.

Table 4: Scale for Attitudes to BIS Use

Scale item	Corrected item-total correlation	Cronbach's Alpha if item deleted
Using the BIS improves company performance	.601	.749
Using the BIS increases company work productivity	.663	.739
I would find the BIS useful in my company	.622	.746
Using the BIS improves employee's performance.	.547	.755
Implementation process of BIS is understandable	.385	.784
IT department has adequate knowledge for BIS implementation	.357	.787

It is easy to integrate BIS with existing solutions	.367	.785
I find BIS in my organization easy to use	.500	.762

The scores for the 8-items were added together to create an attitude scale, with a maximum possible score of 40 and a minimum of 8. Higher scores on the attitudes scale indicated positive attitudes while lower scores indicated negative attitudes to BIS implementation.

2.4.4. BIS Usage

BIS usage was measured with four (4) items on the questionnaire under the BIS Implementation section. When subjected to reliability analysis, the Cronbach's Alpha for the 4 items was 0.701 and items were highly correlated, indicating that the scale was reliable (Hair, 2014). The 4 items included on the scale are tabulated below.

Table 5: Scale for BIS Usage

Scale item	Corrected item-total correlation	Cronbach's Alpha if item deleted
BI is used in all organizational units, and hierarchical levels	.427	.796
Internal (both structured and unstructured) and external data are integrated, and requirements (e.g. data quality) are met	.443	.795
BI is base for all decisions, and have a critical impact on organizational performance	.524	.787
Comprehensive business/IT alignment	.464	.793

The scores for the 4 items were added together and used to measure BIS usage as a scale with a maximum possible score of 20 and a minimum of 4. Based on a previous study by (Farahat, 2012), the BIS scale was dichotomised into categories (low and high usage of BIS); participants who had at least 70% on the BIS usage scale were in high usage category, while participants below 70% had a low usage of BIS.

2.5. Procedure

In July 2019, the survey was administered to the research sample at the four (4) public institutions where the study was being conducted. The HR department in the different institutions sent out an email to all their supervisors, managers and executives that were expected to participate in this study. The email informed them of a research study that was being conducted in the institution and requested them to participate in the study. A letter of introduction was also given to the researcher by the HR departments which was used to gain access to the different respondents at their workstations.

The researcher accessed the respondents at their workstations, where a brief introduction of the researcher was done. The letter of approval to conduct the research in the organisation was presented to the respondents (see appendix 2). The researcher explained to the respondents the purpose of the research by stating that; while many institutions had implemented BIS technologies, majority had not matured their BIS adoption to the stage of using the actionable insight that is created from the analysis of data for informed decision making. They were informed that the research was being conducted to assess the level of BIS usage in the support of decision making at the middle and top management levels in their institution. They were also informed that the research would take up 12-15 mins of their time.

The respondents were told that the survey could be accessed online, and at their permission, the link to the online survey was typed into the browser's address bar on their individual computers. Majority of the respondents had trouble interpreting the instructions to the section that assessed organisational culture. The instructions were; "2. Please divide 10 points among the four options (A, B, C, D) depending on how closely each option describes your institution." The claimed the instruction was not clear

on what was required. For this reason, each respondent was assisted in interpreting what was required, apart from a few who figured it out themselves. The researcher setup the questionnaire on the computers of all the participants in each department and waited on each participant until all the until they had successfully responded to the questionnaire. The researcher would then ask the respondents to give feedback on their experience with the tool, which was noted.

2.6. Research Ethics

Bryman and Bell (2007) outline ten critical ethical considerations that must be taken into account in a dissertation. In this study, the following ethical considerations that were anticipated to arise were identified and taken into account.

1. Full consent should be obtained from participants before the study. Approval to conduct the study in the organisations selected was obtained from the organization's authorities (see appendix 2), and the participants were satisfactorily given information to ensure that they understood the implications of participation and were aware that they could decide to participate or not.
2. Ensuring privacy protection of the research participants and confidentiality of research data by ensuring that anonymity is maintained. In keeping with this ethical standard, no confidential information was obtained from the respondents in order to decrease any likely harm to the f.
3. Honesty and transparent communication of research data by ensuring that participants are fully informed of all the details they require pertaining to the research. Respondents were asked to respond to the questions in the instrument based on their personal view, by stating in the questionnaire that there were no right or wrong answers. Instructions on how to answer the questions were added

at the beginning of each section to the tool to remove any chances of tricking the participants

4. Biased and false representation of information and primary data finding was avoided as all data collection tools were kept. Recognition of other writer's work used in the research has been ensured using the Harvard referencing system.

2.7. Data Analysis

This section will present the data analysis procedures of the quantitative data which was collected to address the research question. After data collection, the data was screened for errors by eliminating incomplete surveys and checking for missing values. Organisational culture was analysed using a pre-programmed Microsoft Excel based OCAI scoring tool (Sune Dueholm Müller, 2019). The data was then analyzed using SPSS to understand the relationships between organisational culture and the adoption of business intelligence systems. Statistical tests used in analysis included independent sample T Test, chi square test and logistic regression.

2.7.1. Organizational Culture Analysis

Analysis of the questions was done by calculating the average scores for each letter (A, B, C, D) under the six questions that represent the dimensions of culture. For instance, the scores for A alternatives were summed up and divided by 6 to get the average, this process was repeated for each of the four alternatives. The average result of each alternative represents the four types of culture (A= Clan, B= Adhocracy, C= Market, D= Hierarchy). Then, the average scores were plotted on a two-dimension graph with four quadrants. The quadrant in which the graph shifts further from the center represents the dominant culture, hence forming the organisational culture profile of an organisation. This profile is an expression of the perceptions, thoughts and feelings of employees forming the culture of that organisation.

2.7.2. Statistical Data Analysis

Further statistical data analysis was conducted using IBM SPSS 25. Bivariate analysis techniques that were used included independent samples T Test and correlation tests. Covariates that were introduced in the model were identified from the literature and these were age, gender, education level, position in an institution and an individual's number of years with an institution. Before the logistic regression was run, bivariate analysis (chi-square crosstabulations and independent samples T-Test) were done to test the relationship between covariates and usage of BIS. Statistical significance was set at a probability value less than 0.05 and Odds Ratios and their 95% Confidence intervals were used as effect sizes for logistic regression.

3. Results

This chapter will present the findings from the analysis of the quantitative data which was collected in the study. It is divided into two (2) parts; the first section presents the findings of the Organizational Culture Assessment Instrument (OCAI) in order to assess the dominant culture exhibited by the organisations under study. The second section covers attitudes and behavioral intention to use business intelligence systems in decision making as well as reports the descriptive statistics that determine the relationship between organizational culture and adoption of BIS.

3.1. Findings of the Organizational Culture Assessment Instrument

The Organizational Culture Assessment Instrument (OCAI) was used to determine the culture exhibited by each institution in the universe under study. According to Tharp 2009, a global view of the results of the four (4) institutions across the six (6) dimensions of culture can be presented. However, since one (1) of the institutions hereafter referred to as "Organisation B" is a quasi-government with both public and private business characteristics, the results were clustered and presented by grouping institutions based

on the culture they exhibited. The decision to cluster was mainly because the responses from "Organisation B" at 38% would have a significant impact on global results (see figure 6).

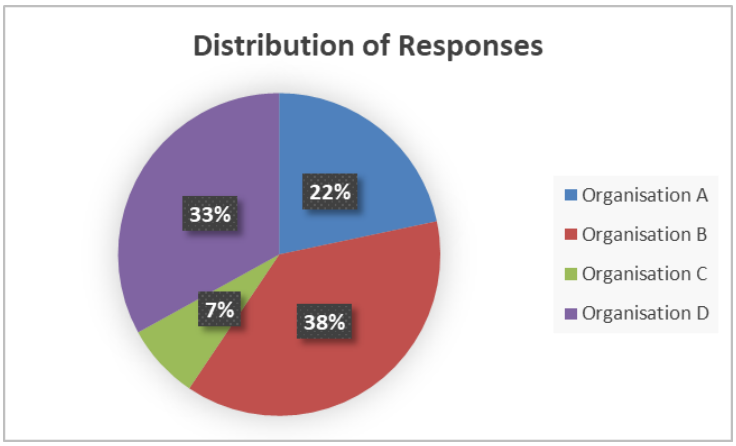


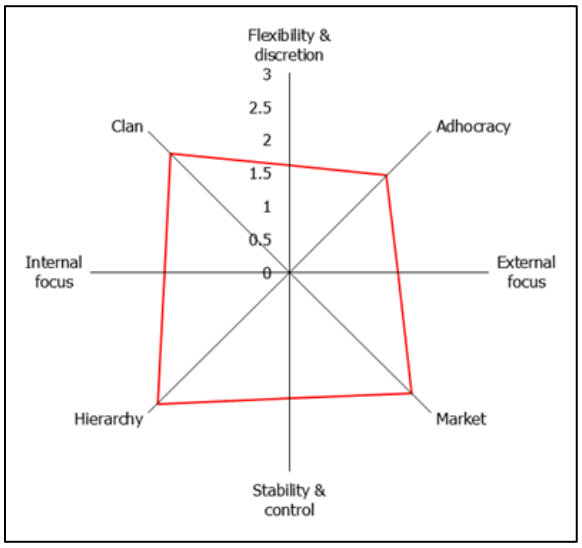
Figure 7: Distribution of Organizational Responses

The two cultures that emerged from this study are consistent with the literature, Cameron and Quinn (2011) have illustrated that typically public institutions exhibit the hierarchy culture while financial organisations exhibit both market and hierarchical culture. The hierarchy culture emphasizes an internal focus as well as stability and control. Organisations with this culture are driven by efficiency, reliability, smooth running and speed. The market culture is externally focused and values stability and control as well. It is driven by competitiveness and productivity. Three of the institutions under study that exhibited the hierarchical culture are typical public service institutions, while the one institution that exhibited a market culture is a government financial institution that operates as a quasi-government organisation.

3.1.1. Dominant Culture

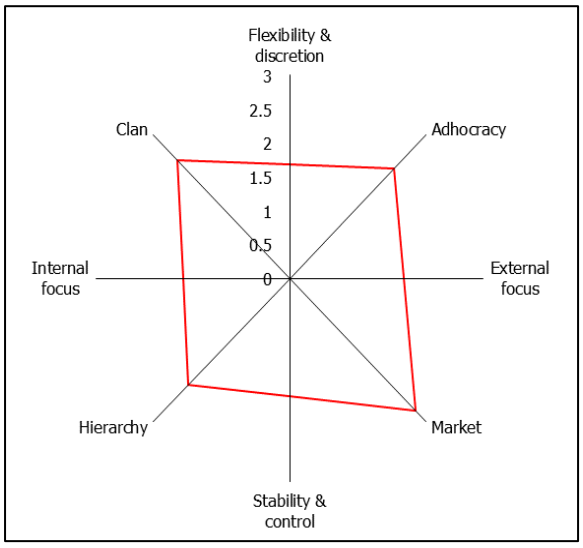
According to Cameron and Quinn (2011), most organisations exhibit all the four culture types, however there is usually a dominant culture type which has the highest average score in comparison to other culture types, even though there are slight differences in the scores. Each of the four (4) institution's culture was analyzed using the

OCAI tool and two dominant cultures emerged. Three (3) of the organisation A, C & D exhibited a hierarchy culture while one (1) organisation B exhibited a market culture (see figure 7 & 8)



Score	Now
Adhocracy	2.06
Market	2.59
Hierarchy	2.81
Clan	2.53

Figure 8: Dominant Culture: Hierarchy

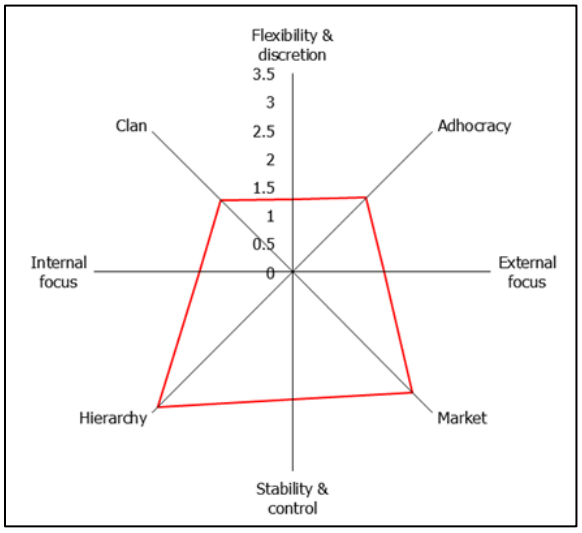


Score	Now
Adhocracy	2.28
Market	2.76
Hierarchy	2.23
Clan	2.47

Figure 9: Dominant Culture: Market

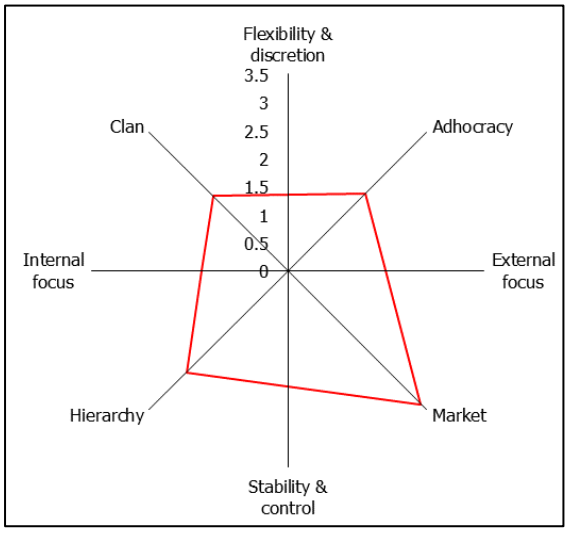
The OCAI tool creates 4 broad classifications of culture namely; adhocracy, market, hierarchy, and clan. Considerable research in the area of organizational culture has produced the competing values framework upon which the OCAI instrument is based. The OCAI instrument used six (6) key dimensions which form the basis for assessing organizational culture in order to define the different cultures types and to identify the unique characteristics that distinguish them from each other. This section analyses the data collected to determine the respondent's perception of shared values, norms and attitudes in their organisations based on these six dimensions.

a) Dominant Characteristics



Score	Now
Adhocracy	1.84
Market	3
Hierarchy	3.36
Clan	1.78

Figure 10: Dominant Characteristics: Hierarchy



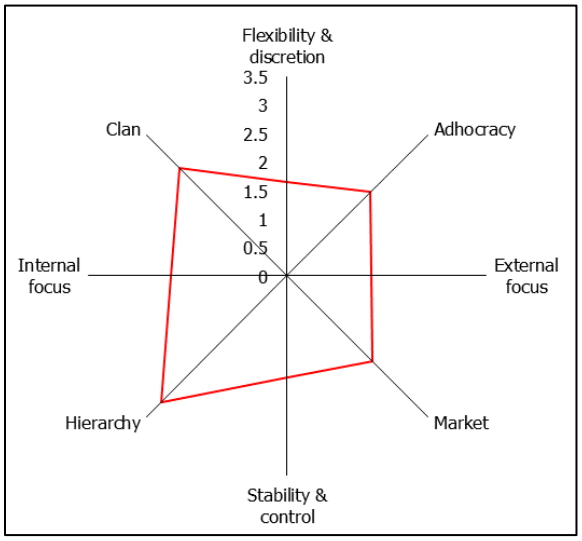
Score	Now
Adhocracy	1.95
Market	3.36
Hierarchy	2.56
Clan	1.87

Figure 11: Dominant Characteristics: Market

In this aspect, for organisations A, C & D, hierarchy culture scores highest at (3.36) meaning that the organisations A, C & D emphasize stability and control with formal procedures governing work. The other cultural types score as follows: market (3), Adhocracy (1.84) and clan (1.78). Adhocracy and clan score the least meaning that creativity and innovation in adhocracy, as well as cohesiveness and team building in clan are not of major concern.

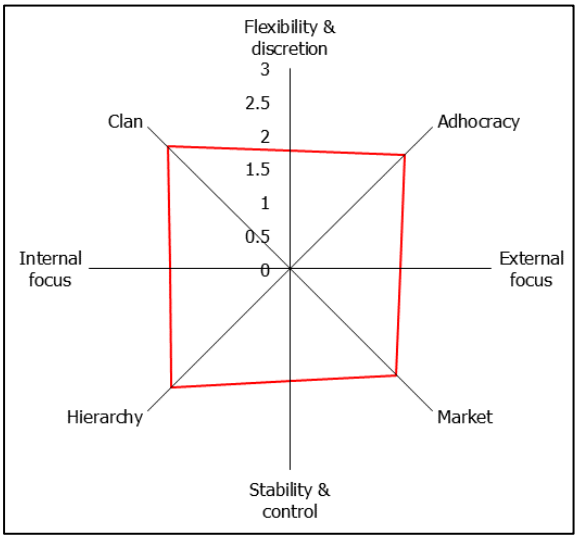
For organization B, market culture scores highest at 3.36 denoting that the dominant characteristics are to be results-oriented with the primary interest of getting the job done. This is closely followed by hierarchy at (2.56), adhocracy at (1.95) and clan at (1.87). Similar to organisations A, C, &D, creativity and innovation as well as team building are not highly emphasized.

b) Organisational Leadership



Score	Now
Adhocracy	2.07
Market	2.12
Hierarchy	3.13
Clan	2.66

Figure 12: Organisational Leadership: Hierarchy



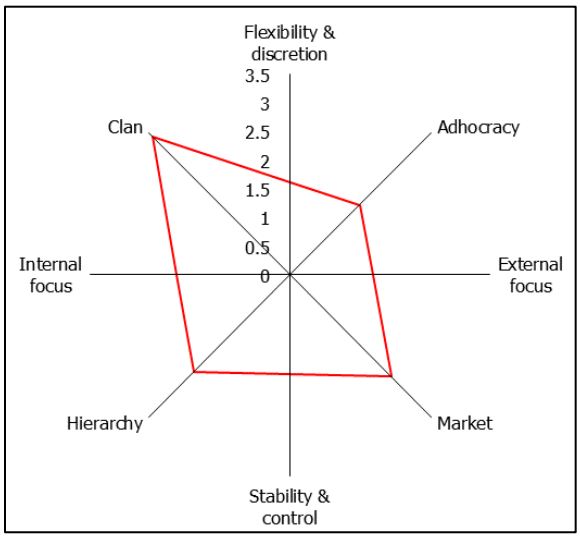
Score	Now
Adhocracy	2.41
Market	2.24
Hierarchy	2.51
Clan	2.58

Figure 13: Organisational Leadership: Market

Regarding this dimension, in organisations A, C, & D leaders are considerably viewed as coordinators and organizers with hierarchy culture scoring (3.13). Unlike the dominant characteristics dimension, clan takes second place at (2.66) denoting that leaders are considered as mentors and parent figures. Followed by market culture at (2.12), leaders are also viewed as hard drivers and competitors. They are however least viewed as innovators and risk takers because of the low score in adhocracy culture at (2.07)

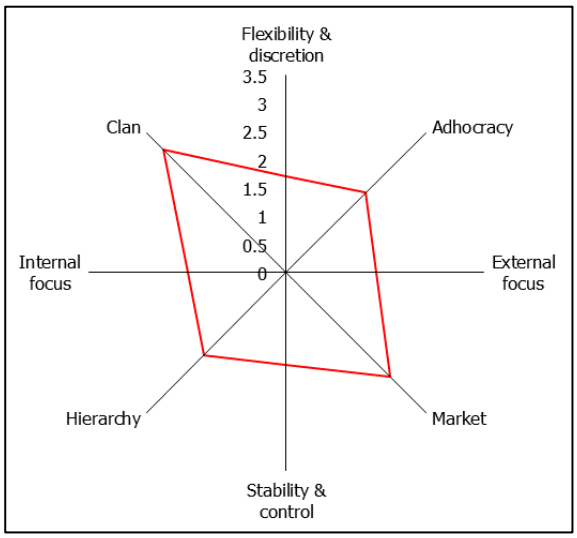
Organization B views its leaders primarily as mentors and parent figures with a clan score of (2.58). They are also considered as coordinators and organizers due to second placed hierarchy culture at (2.51). Similar to organisations A, C & D leaders will least likely exhibit hard driving and competitive traits, but they are also not considered as innovative and risk takers.

c) Management of Employees



Score	Now
Adhocracy	1.72
Market	2.5
Hierarchy	2.37
Clan	3.39

Figure 14: Management of Employees: Hierarchy



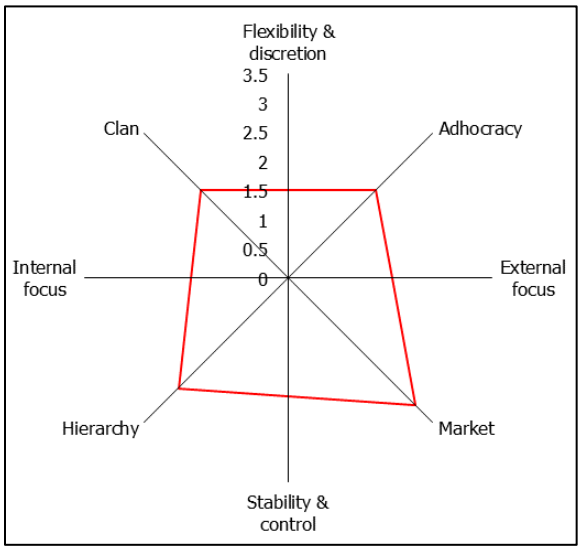
Score	Now
Adhocracy	2
Market	2.60
Hierarchy	2.07
Clan	3.07

Figure 15: Management of Employees: Market

In organisations A, C & D management of employees corresponds to the clan culture at (3.39) which is characterized by teamwork, consensus and participation qualities. This is followed by the market culture at (2.5) with a drive to pursue profitability and high competitiveness and goal achievement. Hierarchy in third place at (2.37) ensures a controlled and structured environment with formal procedures and rules to govern employees. The least prioritized component is fostering creative and innovative processes with adhocracy at 1.72

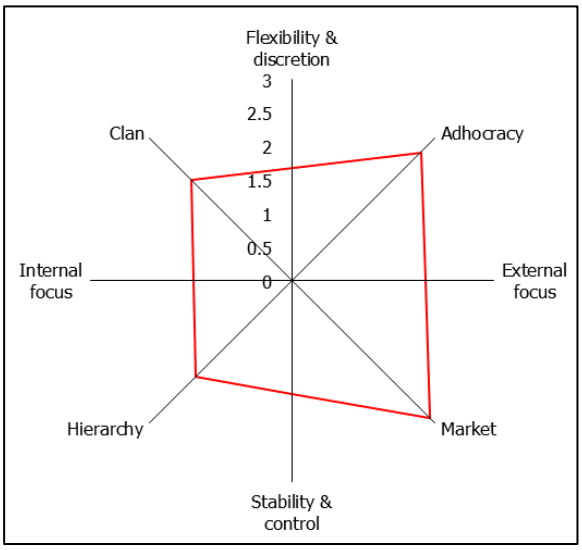
In the management of its employees, organization B follows a similar path characterized by a clan culture environment, followed by hierarchy and then market culture. Little emphasis is also put on adhocracy culture which ensures a creative and innovative environment.

d) Organisation Glue



Score	Now
Adhocracy	2.12
Market	3.07
Hierarchy	2.66
Clan	2.13

Figure 16: Organisation Glue: Hierarchy



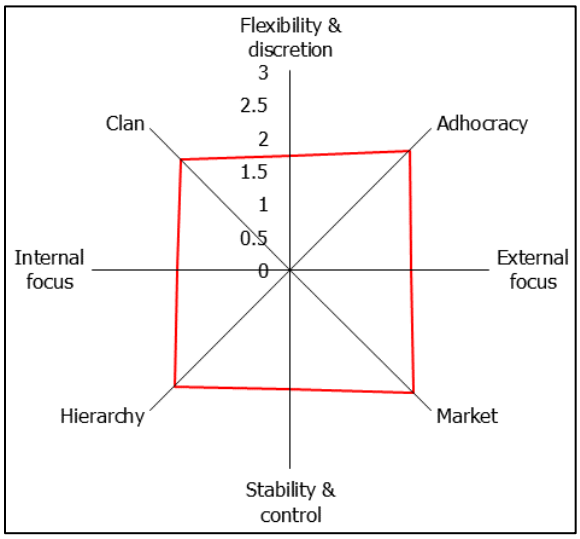
Score	Now
Adhocracy	2.70
Market	2.90
Hierarchy	2.02
Clan	2.12

Figure 17: Organisation Glue: Market

The glue that holds organisations A, C & D together is achievement and goal accomplishment in the market culture at (3.07). This is followed by rules and formal procedures of the hierarchy culture at (2.66). Clan and adhocracy cultures come in last place meaning that loyalty and mutual trust as well as a commitment to innovation and development are not viewed as cohesive factors.

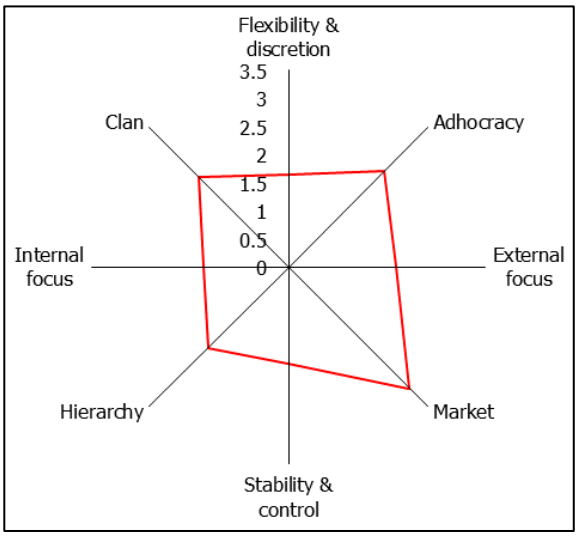
Similarly, organization B is primarily held together by market culture qualities of goal accomplishment and competitiveness. However, this organization is committed to the innovation and development qualities of the adhocracy culture as well. This is followed by the clan culture which creates commitment to the institution as well as loyalty and mutual trust. Rules and formal procedures come last unlike the other institutions where they come in second place.

e) Strategic Emphasis



Score	Now
Adhocracy	2.54
Market	2.62
Hierarchy	2.48
Clan	2.34

Figure 18: Strategic Emphasis: Hierarchy



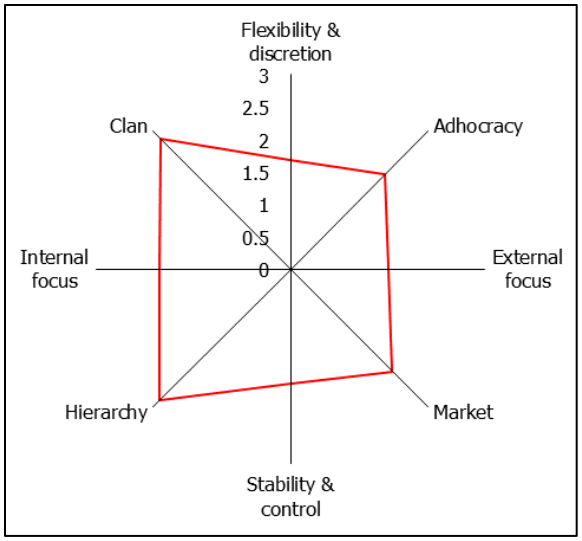
Score	Now
Adhocracy	2.41
Market	3.04
Hierarchy	2.02
Clan	2.26

Figure 19: Strategic Emphasis: Market

For organisations A, C & D strategic emphasis is on competitiveness and achievement. This is closely followed by adhocracy at (2.54) which emphasizes acquisition of new resources and seeking new challenges. Efficiency, stability and control are in third place, while human capital development, participation and trust come in last place.

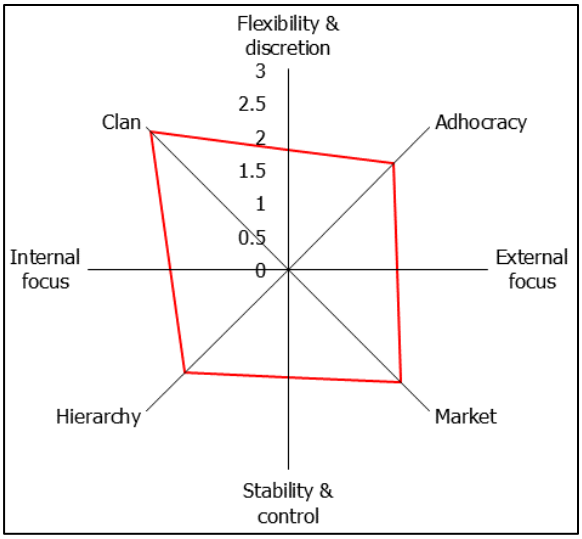
Similarly, the strategic emphasis of organization B matches the market culture at (3.04), also followed by the adhocracy qualities. Formal rules and procedures come in last place as they are preceded by a focus on human development, openness, trust and participation.

f) Criteria of Success



Score	Now
Adhocracy	2.06
Market	2.22
Hierarchy	2.86
Clan	2.84

Figure 20: Criteria of Success: Hierarchy



Score	Now
Adhocracy	2.24
Market	2.39
Hierarchy	2.19
Clan	2.92

Figure 21: Criteria of Success: Market

For organisations A, C & D, success is measured by efficiency and smooth running of the organization under the hierarchy culture at (2.86). This is closely followed by a focus on human capital development, employee commitment and an interest in people under the clan culture at (2.84). Market leadership under the market culture takes the third place while focus on unique and new products takes the least priority.

On the contrary, organization B prioritizes human capital development, employee commitment and concern for people under the clan culture at (2.92). This is followed by a focus on market leadership under the market culture at (2.39). Creating unique and new products precedes a focus on efficiency and smooth running of the hierarchy culture.

3.2. Findings from Statistical Analysis

3.2.1. Association between Covariates and BIS usage

Using chi-square crosstabulation, the following covariates were not significantly related to BIS usage: [$\chi 2$ (1) = 22.573, p=0.109]; gender [$\chi 2$ (1) = 0.014, p=0.907]; education [$\chi 2$ (1) = 2.448, p=0.118]; position in management [$\chi 2$ (1) = 1.822, p=0.177] and experience in the institution [$\chi 2$ (1) = 0.011, p=0.915]. To compare the relationship between BIS usage and attitudes toward BIS use, an independent samples T-Test was used. People who had a higher usage of BIS had more positive attitudes toward BIS use, with a mean score of 33.39 (SD=3.35), than people who had a low usage of BIS implementation, who had a mean score of 30.67 (SD=5.51) on the attitudes scale. This difference was statistically significant, [t (104) = -2.982, p=0.004] suggesting that higher BIS usage was more associated with more positive attitudes and low usage of BIS was associated with less positive attitudes to BIS implementation. The relationship was moderately strong with an eta-squared value of 0.079 suggesting that attitudes toward BIS use accounted for 7.9% of the variation in low or high usage of BIS.

The relationship between organisation culture and BIS usage was examined using a chi-square crosstabulation. There was no significant relationship between organisational culture and usage of BIS, [$\chi 2$ (1) = 0.204, p=0.651] suggesting that there was no significant difference in the usage of BIS between market and hierarchical cultures. The results for bivariate analysis are tabulated below.

Table 6: Association Between Covariates and BIS Usage

Variables	High usage (N, %)	Low usage (N, %)	Probability value
Age (18 to 44 years)	63 (74.1)	22 (25.9)	0.109
Age (45 and above)	19 (90.5)	2 (9.5)	
Gender (Female)	18 (78.3)	5 (21.7)	0.907
Gender (Male)	64 (77.1)	19 (22.9)	

Education (Master's degree)	47 (72.3)	18 (27.7)	0.118
Education (Bachelor's degree)	35 (84.4)	6 (14.6)	
Position (Executive and Senior Management)	21 (87.5)	3 (12.5)	0.177
Position (Middle Management)	61 (74.4)	21 (25.6)	
Years in the Organisation (up to 5 years)	23 (76.7)	7 (23.3)	0.915
Years with organisation (above 5 years)	59 (77.6)	17 (22.4)	
Attitudes toward BIS use (Mean, Standard Deviation)	33.39 (3.35)	30.67 (5.51)	0.004*
Organisational Culture (Market)	30 (75)	10 (25)	0.651
Organisational Culture (Hierarchy)	52 (78.8)	14 (21.2)	

*Note: *p<0.05*

3.2.2. Binary Logistic Regression Predicting BIS Usage in Institutions

A binary logistic regression was built using two stages. The first stage included a model with covariates (age, gender, education level, position in institution, years with organisation and attitudes toward BIS use) only and the second model added organisational cultures to the covariates only model. The covariates only model significantly predicted usage of BIS and fit the data well, [$\chi 2$ (6) = 14.869, p=0.021, Hosmer and Lemeshow = 0.688]. The model explained 19.9% of variation in high and low usage of BIS, (Nagelkerke = 0.199). However only the attitudes toward BIS use significantly predicted usage of BIS with every unit increase in the attitudes toward BIS use scale, chances of high usage of BIS increased (Odds Ratio=1.170; CI 95% 1.027 to 1.332). All the other covariates did not significantly predict high usage of BIS. The results of the first model are tabulated below.

Table 7: Model with Covariates Only

Variables in the model	**B**	**S.E.**	**Sig.**	**Odds ratio**	**95% C.I for odds ratio**	
					Lower	**Upper**
Age in Two Cats (Ref =18 to 44years)	.878	.838	.294	2.407	.466	12.426
Years with Organisation (Ref= up to 5 years)	.058	.589	.922	1.060	.334	3.359
Attitudes toward BIS use	.157	.066	.018*	1.170	1.027	1.332

Scale						
Gender (Ref=Male)	.031	.625	.960	1.032	.303	3.515
Education Level (Ref=Bachelor's Degree)	1.000	.573	.081	2.719	.884	8.360
Position in Institution (Ref=middle management)	.991	.724	.171	2.693	.651	11.141
Constant	-4.528	2.163	.036	.011		

*Note: *p<0.05, Cox and Snell =0.131, Nagelkerke=0.199*

In the second model, organisational culture was introduced to the model with covariates only. The model significantly predicted the usage of BIS and the data fit the model well, [$\chi 2$ (7) = 14.879, p=0.021, Hosmer and Lemeshow = 0.853]. The variation explained by the model remained constant at 19.9% (Nagelkerke=0.199). However organisational culture was found not to predict usage of BIS, controlling for the covariates, (Odds Ratio=0.946, CI 95% 0.326 to 2.743). Only attitudes toward BIS use remained significantly predicting usage of BIS, (Odds Ratio=1.169, CI 95% 1.027 to 1.332). The results of the model are tabulated below.

Table 8: Model with Covariates and Organisational Culture

Variables in the model	**B**	**S.E.**	**Sig.**	**Odds ratio**	**95% C.I for odds ratio**	
					Lower	**Upper**
Age in two cats (Ref =18 to 44years)	.893	.850	.293	2.443	.462	12.917
Years with Organisation (Ref= up to 5 years)	.070	.601	.907	1.073	.330	3.483
Attitudes toward BIS use Scale	.156	.066	.018	1.169	1.027	1.332
Gender (Ref=Male)	.038	.629	.952	1.038	.303	3.562
Education Level (Ref=Bachelor's Degree)	1.011	.582	.083	2.747	.877	8.601
Position in Organisation (Ref=middle management)	.991	.724	.171	2.695	.651	11.147
Organisational Culture (Ref=Market)	-.056	.543	.918	.946	.326	2.743
Constant	-4.504	2.177	.039	.011		

*Note: *p<0.05, Cox and Snell =0.131, Nagelkerke=0.199*

3.3.3. Summary of the Findings

The organisational culture of hierarchy and market resulted dominantly after the culture assessment using the OCAI tool. Three public institutions exhibited a hierarchy culture while one (1) exhibited the market culture.

In bivariate analysis, only attitudes toward BIS use had a significant relationship with BIS usage. Using a logistic regression model, organisational culture was not found to significantly predict the usage of BIS in an institution. Of the covariates included in the model, only attitudes toward BIS use significantly predicted usage of BIS, with every unit increase on the attitudes scale chances of high usage of BIS increase also.

4. Discussion

This chapter synthesizes, interprets and discusses the findings from the data analysis in relation to; the research question and objectives of the study, the hypotheses, and the previous research theories identified in the review of the literature. Using quantitative research methods, the research study examined the effect of the different organisational culture types on the adoption of business intelligence systems in the context of the Ugandan public sector. The chapter is divided into three sections to address the research question. First section will discuss the organisational culture exhibited by organisations in the Ugandan Public Sector. The second section will focus on the main objective of the study which is to determine the relationship between organisational culture and the adoption of business intelligence systems in the Ugandan public sector. The third section will discuss emerging factors in the findings related to the adoption of business intelligence systems. The chapter will then give recommendations and a conclusion.

4.1. Organisational Culture in the Ugandan Public Sector

The main aim of this research study was to determine the role of Organisational culture in the adoption of business intelligence systems in Ugandan public institutions. Adoption of business intelligence as it was used in this study referred to how business intelligence benefits can be maximized post the implementation stage. This research interest was premised on the fact that studies have found that, while many organisations have invested highly in implementing business intelligence systems, actual usage of BIS to support an informational approach to decision making remains low. The organisations selected for this study were expected to have largely implemented business intelligence systems. The study was intended to find out whether they have integrated business intelligence into their decision-making process, and what role organisational culture plays in this endeavour.

In order to assess the prevailing organisational culture type for the institutions that participated in the study, the Organisational Culture Assessment Tool (OCAI) developed by Cameron and Quinn (2011) was adopted. The institutions selected for this study were public sector organisations offering services across different sectors of the economy under direct supervision of the central government of Uganda. However, one of the institutions though mandated by the central government to function on its behalf, it is operated as a quasi-government meaning that it has both public and private elements.

The OCAI tool that is based on the Competing Values Framework has classified culture into four (4) types; clan, adhocracy, market and hierarchy. The 4 public institutions that participated in the study exhibited only two cultures of the four types that is; hierarchy and market cultures. Organisations that fit in the hierarchy culture are characterised by rules and procedures governing work, a formal and structured work

environment, an efficiency-oriented leadership that champions smooth running and coordination while ensuring stability and predictability. Job security is ensured (Cameron and Quinn, 2011). Public institutions in Uganda were generally expected to exhibit this type of characteristics, and it was not a surprise that three (3) of the four (4) institutions exhibited this type of culture.

Surprisingly, one (1) organisation exhibited the market culture which is characterized by being results-driven and as a result people are highly competitive and goal focused. The leadership in turn is hard driving, aggressive and demanding. Winning in the market is the overall focus of the organisation, with long term emphasis on competitiveness and achievement of planned goals and targets. Success is determined based on reaching the highest market share and penetration (Cameron and Quinn, 2011). This organisation is operated as a quasi-government, mandated by a legal act but operated as a private institution. This explains why it exhibited a dominant market culture in comparison to the other three organisations.

Important to note is that according to Cameron and Quinn (2011) no single culture is ideal for optimal performance. Their research has found that the culture profile of majority of organisations has a dominant culture type. Furthermore, they suggest that these organisations rarely have one culture type but rather tend to manifest a combination of the four types even though there are small differences in the scores among the cultures. The quasi-government organisation was strongly dominated by the market culture at a score of (2.76), then followed by the clan culture at 2.47, adhocracy culture at 2.28 and lastly the hierarchy culture at (2.23). This is in stark contrast to the other three (3) organisations that were dominated by the hierarchy culture at (2.81), followed by the market culture at 2.59, then the clan culture at 2.53 and lastly the adhocracy culture at (2.06).

According to Cameron and Quinn (2011) a culture type will function optimally if the domain of an organisations activities correspond to that culture. An interesting observation is that the quasi-government organisation which is market-oriented had the lowest score for hierarchy culture. This is consistent with the fact that private modelled organisations are more likely to exhibit a market culture because they are more competitive and results-oriented, as opposed to public institutions with high political and stakeholder interests resulting into slow and bureaucratic processes, often not ideal for a fast-paced and volatile business environment. Therefore, given that the quasi-government institution is operated as a private institution, it is no surprise that they had a strong commitment to achieving results and winning in the marketplace, and in turn manifesting a weaker commitment to formal rules and procedural processes.

According to Al-Gahtani (2004), typical public sector institutions fit in the hierarchy quadrant of the culture dimensions. He also confirms that these institutions are not inclined to adopting new innovations of Information Technology (IT). The three (3) organisations that fit in the hierarchy quadrant were dominated by the hierarchy culture at (2.81), followed by the market culture at 2.59, the clan culture at 2.53 and lastly the adhocracy culture at (2.06). The adhocracy culture is considered dynamic entrepreneurial and innovative where employees willingly take risks. It also encourages personal initiative and autonomy. Organisations endeavor to get ahead of the competition with cutting edge products, services and new knowledge. It is therefore no surprise that the strongly hierarchical public institutions were averse to innovation and risk taking as well as autonomy, since rules and procedures govern the work that people do in the hierarchy context.

Cameron and Quinn (2011) suggest that organisational effectiveness is achieved by linking the culture that an organisation develops with its vision, value and strategy. The organisation that exhibited a market culture has a vision to be the service provider of choice in its business domain. Its mission is tied to offering its clients relevant products through continuous innovation and its values include customer centricity and innovation. This is all consistent with the characteristics of the market culture which is to win in the marketplace, and to offer innovative services, products and new knowledge ahead of the competition. The other three organisations that exhibited the hierarchy culture are all central authorities whose vision, mission and mandate are centred around coordination, administration, regulation, policy formulation and offering guidelines. All this is in line with the rules, policies and formal procedures of the hierarchy culture.

4.2. The Relationship between Organisational Culture and Business Intelligence Adoption

The research study's primary objective was to determine the influence of organisational culture on the adoption of business intelligence systems by public sector organisations in Uganda. The Hypotheses were developed based on the review of organisational culture and IS research studies. This section will discuss the hypotheses tested to determine the relationship between the two variables.

Several previous studies found organisational culture to have a significant impact on the adoption of IS/IT (Al-Gahtani, 2004; Abousaber and Papazafeiropoulou, 2011; Senarathna *et al.*, 2014; Al-Dmour, Nweiran and Al-Dmour, 2017). The studies reported that adhocracy culture was significantly and positively related to IS/IT adoption. While hierarchy culture was significantly and negatively related to IS/IT adoption. The clan and market culture types were found not to have a significant impact on IS/IT adoption. The

hypothesis statements tested were developed from these findings in the literature as shown below.

H1: The organisations that have an adhocracy culture type have positive BIS adoption.

H2: The organisations that have a hierarchical culture type have negative BIS adoption.

H3: The clan and market culture types do not have a significant correlation to BIS adoption

The hypothesis testing confirmed only H3 of the hypothesis statements. From the organisational culture assessment of the four (4) public institutions in Uganda, only the hierarchy and market culture emerged as dominant culture types in these organisations. The clan and adhocracy culture types were not identified as dominant cultures in any of the organisations. The hierarchy culture type was found not to have a statistically significant influence on BIS adoption, which contradicted H2. Market culture type was found not to have a statistically significant correlation to BIS adoption, hence confirming H3.

Furthermore, there was no significant difference in the usage of BIS between market or hierarchical cultures, meaning that while hierarchy seemed to have a higher BIS usage score on the scale, the differences were only by chance. Hierarchical culture had a higher BIS usage score which may be explained by the fact that most public sector organisations tend to exhibit a hierarchy culture and therefore any BIS usage may be as a result of the fact that they are trying to adopt BIS regardless of their culture type. A study by Twati and Gammack (2006) on IS adoption in Libyan public institutions found that the hierarchy organisational culture emerged predominantly in public institutions, and corresponding to this study, there was no significant IS adoption in these institutions.

Studying Saudi Arabian organisations, Al-Gahtani (2004), found that organisational culture characteristics namely, age, level of education and gender affected people's perception of IS/IT. As part of this study, demographic details were collected in order to assess their association to BIS usage. The following organisational culture characteristics were collected; age, gender, level of education number of years with organisation and position held in organisation. Using Chi Square crosstabulation, these covariates were fount not to have a significant impact on BIS usage in Ugandan public organisations.

4.3. Emerging Factors Related to Business Intelligence Systems Adoption

Twati and Gammack (2006), suggested that partial IS/IT adoption when organizational culture is not a significant factor implies that there are other factors affecting IS/IT adoption, which must be identified using other variables. According to a notion central to the Technology Acceptance Model (TAM), acceptance of technology is influenced by; perceptions of usefulness and ease of use of the technology. When the two variables are high, the individual develops a positive attitude towards the technology, which in turn influences usage. Therefore, as part of this study, the perceived usefulness and perceived ease of use variables were combined to form the attitudes towards BIS usage variable. The attitudes toward BIS usage were then tested for statistical significance against BIS adoption, and were found to have a significant relationship with BIS usage.

4.4. Recommendations

Organisational context in the organisational change process is an essential consideration when planning the adoption of new IS/IT systems and innovations.

Determining the extent of organisational change required in order to adopt new IS/IT systems is critical (Gladwin, 2003). The private sector has successfully adopted business intelligence systems because of their organisational context that favours flexibility, innovation and change (Gladwin, 2003). Despite this success with their counterparts, the public sector still faces challenges in embracing the capabilities that business intelligence systems offer in decision support. This may be because public sector organisations operate in a non-competitive context and therefore have unique objectives. However, several transactions and activities cut across both private and public sector creating similar problems for decision-makers.

In order to effect the organisational change needed to cut costs, improve service delivery and leverage many other benefits linked to the adoption of BIS, the public sector which is characterised by formal rules, structure and policies must transform to match the best practices of private sector organisations in effective management. According to the reviewed literature, some studies have stated that it is detrimental for the public sector to fully model the private sector context. Therefore, the focus should be put into assessing the unique features of the public sector for a hybrid model, in order to adapt the change and innovation friendly measures to its complex structure and unique objectives.

To create this alignment, the public sector requires competent leaders with clear insight into organisational capabilities. Using BIS to support decision making is a move in the direction of leveraging managerial effectiveness (Gladwin, 2003). Organisational leadership is responsible for developing and transmitting organisational culture. Therefore, competent leadership is in position to develop a specific set of organisational capabilities such innovativeness, entrepreneurism, strong vision which are proven in the literature to create a culture of risk taking, innovation and flexibility considered

favorable to BIS adoption. Furthermore, according to Cameron and Quinn (2011), organisational effectiveness is achieved by linking the culture that an organisation develops with its vision, values and strategy. The public sector should explore cultures that are aligned with their strategic objectives for better outcomes.

4.5. Strengths and Limitations

Firstly, a quantitative research approach requires a larger sample size than a qualitative study. Larger samples allow for identification of considerable relationships in the data, which in turn offers more accurate findings. The sample size of this study due to time constraints was limited to 106 participants, which might not be fully representative. Secondly, the data collection methods to test BI adoption may not have yielded the appropriate responses given that the subject of Business Intelligence is highly technical and some respondents were not able to comprehend its application, or they related BI systems to other Information systems, which might have yielded false results. Thirdly, the method used to recruit participants - targeted sampling has limitations because there was limited access to some of the important participants necessitating that the research is restructured in a different way.

Notwithstanding its limitations, overall, the study is of value to audiences such as researchers and public sector managers. At this stage BIS adoption in the Ugandan context has not been fully researched, and this is likely the first study of its nature conducted on public institutions in Uganda. It has provided an assessment of the prevailing organizational culture in Ugandan Public institutions, and it has shown that organizational culture has no significant impact on the adoption of BIS in the Ugandan Public sector. Future studies can explore other factors that affect adoption of BIS to help public institutions identify bottlenecks to successful implementation. In addition, the hierarchy culture exhibited in public institutions in Uganda has been proven elsewhere

to hamper BIS adoption, therefore this study can inform public sector managers of the need to effect organizational change to favor flexibility and responsiveness. Comparison can be done between the public sector and private sector to determine how private sector best practices for organizational effectiveness can be adapted to the public sector. The attitudes to toward BIS usage can be explored further to determine how institutions can improve their attitude towards technology.

4.6. Conclusion

Although culture has not been found to have a statistically significant impact on the adoption of BIS in this study, which might be attributed to several limitations of this study, the literature is sufficiently filled with evidence that significantly links organizational culture to technology adoption. Therefore, this study cannot ignore the important role that organizational culture plays in the failure or successful adoption of numerous technology projects as shown in the literature. Better understanding of the organizational culture in the public sector is essential for improved strategic outcomes. However, Twati and Gammack (2006) have shown that when culture is not a determining factor in IS/IT adoption, other variables beyond the organizational culture scope must be explored. Therefore, this study recommends further investigation of the factors that influence the adoption of BIS for decision making, in order to determine how the public sector in Uganda can develop BI capabilities that enhance service delivery and efficiency.

5. References

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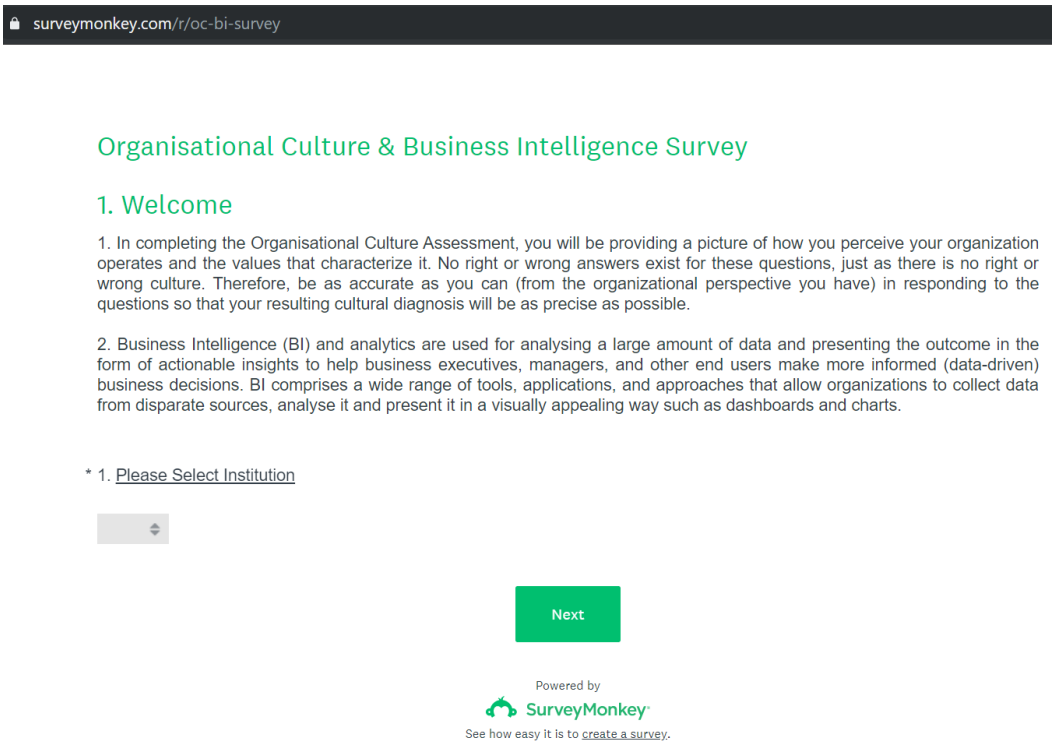
6. Appendix

6.1. Appendix 1 – Primary Research Material



Organisational Culture & Business Intelligence Survey

2. Organisational Culture Assessment

* 2. Please divide 10 points among the four options (A, B, C, D) depending on how closely each option describes your institution.

A. The organization is a very personal place. It is like an extended family. People seem to share a lot of themselves.

B. The organization is a very dynamic entrepreneurial place. People are willing to stick their necks out and take risks.

C. The organization is very results oriented. A major concern is with getting the job done. People are very competitive and achievement oriented.

D. The organization is a very controlled and structured place. Formal procedures generally govern what people do.

* 3. Please divide 10 points among the four options (A, B, C, D) depending on how closely each option describes your institution.

A. The leadership in the organization is generally considered to exemplify mentoring, facilitating, or nurturing.

B. The leadership in the organization is generally considered to exemplify entrepreneurship, innovating, or risk taking.

C. The leadership in the organization is generally considered to exemplify a no-nonsense, aggressive, results-oriented focus.

D. The leadership in the organization is generally considered to exemplify coordinating, organizing, or smooth-running efficiency.

* 4. Please divide 10 points among the four options (A, B, C, D) depending on how closely each option describes your institution.

A. The management style in the organization is characterized by teamwork, consensus and participation.

B. The management style in the organization is characterized by individual risk-taking, innovation, freedom and uniqueness.

C. The management style in the organization is characterized by hard-driving competitiveness, high demands and achievement.

D. The management style in the organization is characterized by security of employment, conformity, predictability, and stability in relationships.

* 5. Please divide 10 points among the four options (A, B, C, D) depending on how closely each option describes your institution.

A. The glue that holds the organization together is loyalty and mutual trust. Commitment to this organization runs high.

B. The glue that holds the organization together is commitment to innovation and development. There is an emphasis on being on the cutting edge.

C. The glue that holds the organization together is the emphasis on achievement and goal accomplishment.

D. The glue that holds the organization together is formal rules and policies. Maintaining a smooth-running organization is important.

* 6. Please divide 10 points among the four options (A, B, C, D) depending on how closely each option describes your institution.

A. The organization emphasizes human development. High trust, openness, and participation persist.

B. The organization emphasizes acquiring new resources and creating new challenges. Trying new things and prospecting for opportunities are valued.

C. The organization emphasizes competitive actions and achievement. Hitting stretch targets and winning in the marketplace are dominant.

D. The organization emphasizes permanence and stability. Efficiency, control, and smooth operations are important.

* 7. Please divide 10 points among the four options (A, B, C, D) depending on how closely each option describes your institution.

A. The organization defines success on the basis of the development of human resources, teamwork, employee commitment and concern for people.

B. The organization defines success on the basis of having the most unique or newest products. It is a product leader and innovator.

C. The organization defines success on the basis of winning in the marketplace and outpacing the competition. Competitive market leadership is key.

D. The organization defines success on the basis of efficiency. Dependable delivery, smooth scheduling, and low-cost production are critical.

Prev Next

Organisational Culture & Business Intelligence Survey

3. Business Intelligence Adoption

Perceived usefulness which is the degree to which a person believes that using the BIS would enhance his/her job performance

* 8. Using the BIS improves company performance

1 strong agree | 2 agree | 3 neutral | 4 disagree | 5 strongly disagree

* 9. Using the BIS increases company work productivity

1 strongly agree | 2 agree | 3 neutral | 4 disagree | 5 strongly disagree

* 10. I would find the BIS useful in my company

1 strongly agree | 2 agree | 3 neutral | 4 disagree | 5 strongly disagree

* 11. Using the BIS improves employee's performance.

1 strongly agree | 2 agree | 3 neutral | 4 disagree | 5 strongly disagree

* 12. Implementation process of BIS is understandable

1 strongly agree | 2 agree | 3 neutral | 4 disagree | 5 strongly disagree

* 13. Company has adequate financial resources for BIS implementation

1 strongly agree | 2 agree | 3 neutral | 4 disagree | 5 strongly disagree

* 14. IT department has adequate knowledge for BIS implementation

1 strongly agree | 2 agree | 3 neutral | 4 disagree | 5 strongly disagree

* 15. It is easy to integrate BIS with existing solutions

1 strongly agree | 2 agree | 3 neutral | 4 disagree | 5 strongly disagree

* 16. I find BIS in my organization easy to use

1 strongly agree | 2 agree | 3 neutral | 4 disagree | 5 strongly disagree

* 17. BI is used in all organizational units, and hierarchical levels

1 strongly agree | 2 agree | 3 neutral | 4 disagree | 5 strongly disagree

* 18. Internal (both structured and unstructured) and external data are integrated, and requirements (e.g. data quality) are met

1 strongly agree | 2 agree | 3 neutral | 4 disagree | 5 strongly disagree

* 19. BI is base for all decisions, and have a critical impact on organizational performance

1 strongly agree | 2 agree | 3 neutral | 4 disagree | 5 strongly disagree

* 20. Comprehensive business/IT alignment

1 strongly agree | 2 agree | 3 neutral | 4 disagree | 5 strongly disagree

Prev Next

Organisational Culture & Business Intelligence Survey

4. Demographics

Answering these would be beneficial to the study.

21. Gender

- ◯ Male
- ◯ Female

22. Age

- ◯ 18-24
- ◯ 25-34
- ◯ 35-44
- ◯ 45-54
- ◯ 55-64
- ◯ 65+

23. Education Level

- ◯ PhD
- ◯ Master Degree
- ◯ Bachelor Degree
- ◯ Diploma

24. Position in Institution

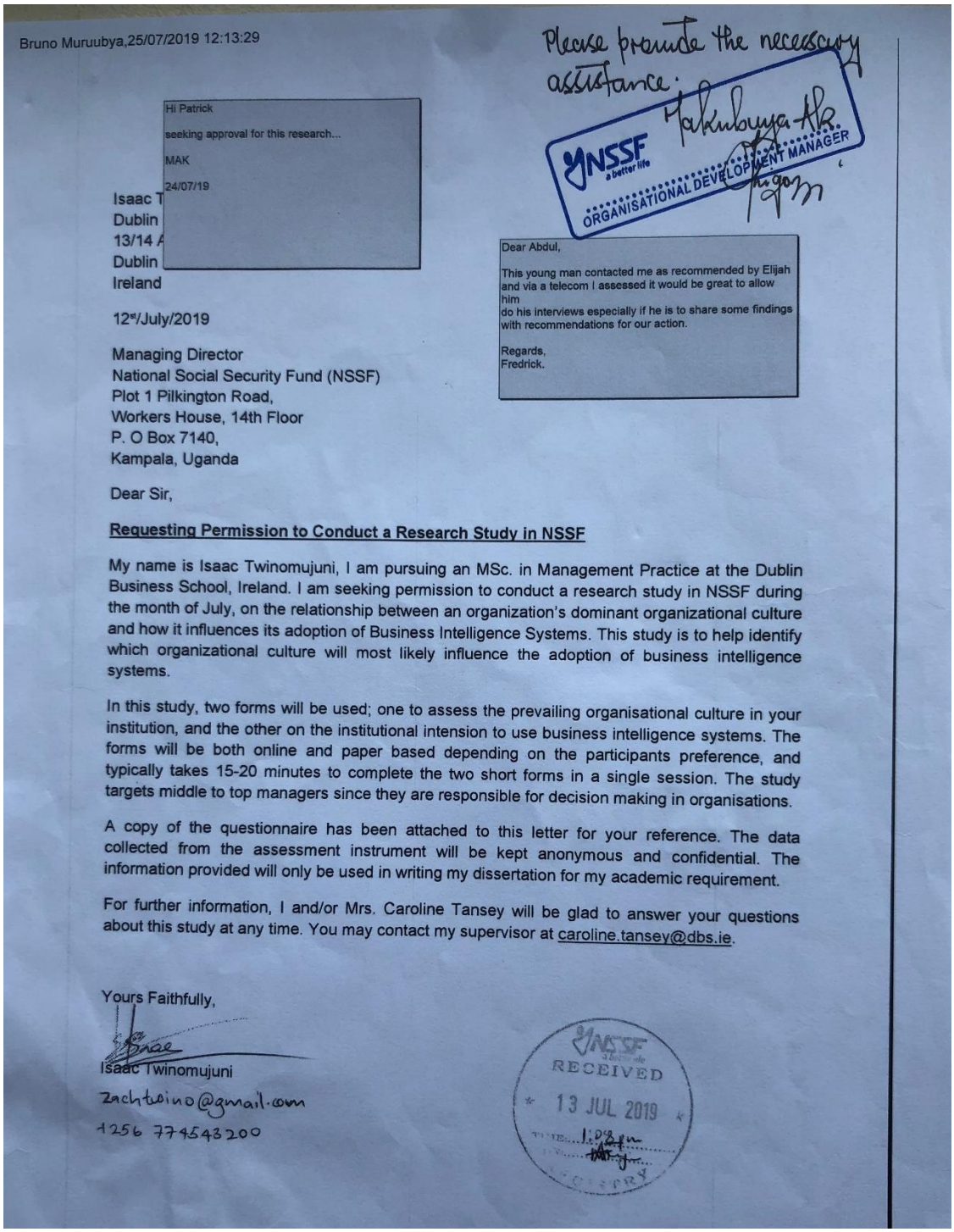
- ◯ Executive
- ◯ Senior Managers
- ◯ Middle Managers

25. Number of Years with Institution

- ◯ 1-5 years
- ◯ 6-10 years
- ◯ 11-15 years
- ◯ 16-20 years
- ◯ 21+

Prev Done

6.2. Appendix 2 – Official Approval to Conduct Research



Bruno Muruubya,25/07/2019 12:13:29

Please provide the necessary assistance.
Hakiubuya Hk.
NSSF a better life
ORGANISATIONAL DEVELOPMENT MANAGER

Hi Patrick
seeking approval for this research...
MAK
24/07/19

Dear Abdul,
This young man contacted me as recommended by Elijah and via a telecom I assessed it would be great to allow him
do his interviews especially if he is to share some findings with recommendations for our action.
Regards,
Fredrick.

Isaac T
Dublin
13/14 A
Dublin
Ireland

12st/July/2019

Managing Director
National Social Security Fund (NSSF)
Plot 1 Pilkington Road,
Workers House, 14th Floor
P. O Box 7140,
Kampala, Uganda

Dear Sir,

Requesting Permission to Conduct a Research Study in NSSF

My name is Isaac Twinomujuni, I am pursuing an MSc. in Management Practice at the Dublin Business School, Ireland. I am seeking permission to conduct a research study in NSSF during the month of July, on the relationship between an organization's dominant organizational culture and how it influences its adoption of Business Intelligence Systems. This study is to help identify which organizational culture will most likely influence the adoption of business intelligence systems.

In this study, two forms will be used; one to assess the prevailing organisational culture in your institution, and the other on the institutional intension to use business intelligence systems. The forms will be both online and paper based depending on the participants preference, and typically takes 15-20 minutes to complete the two short forms in a single session. The study targets middle to top managers since they are responsible for decision making in organisations.

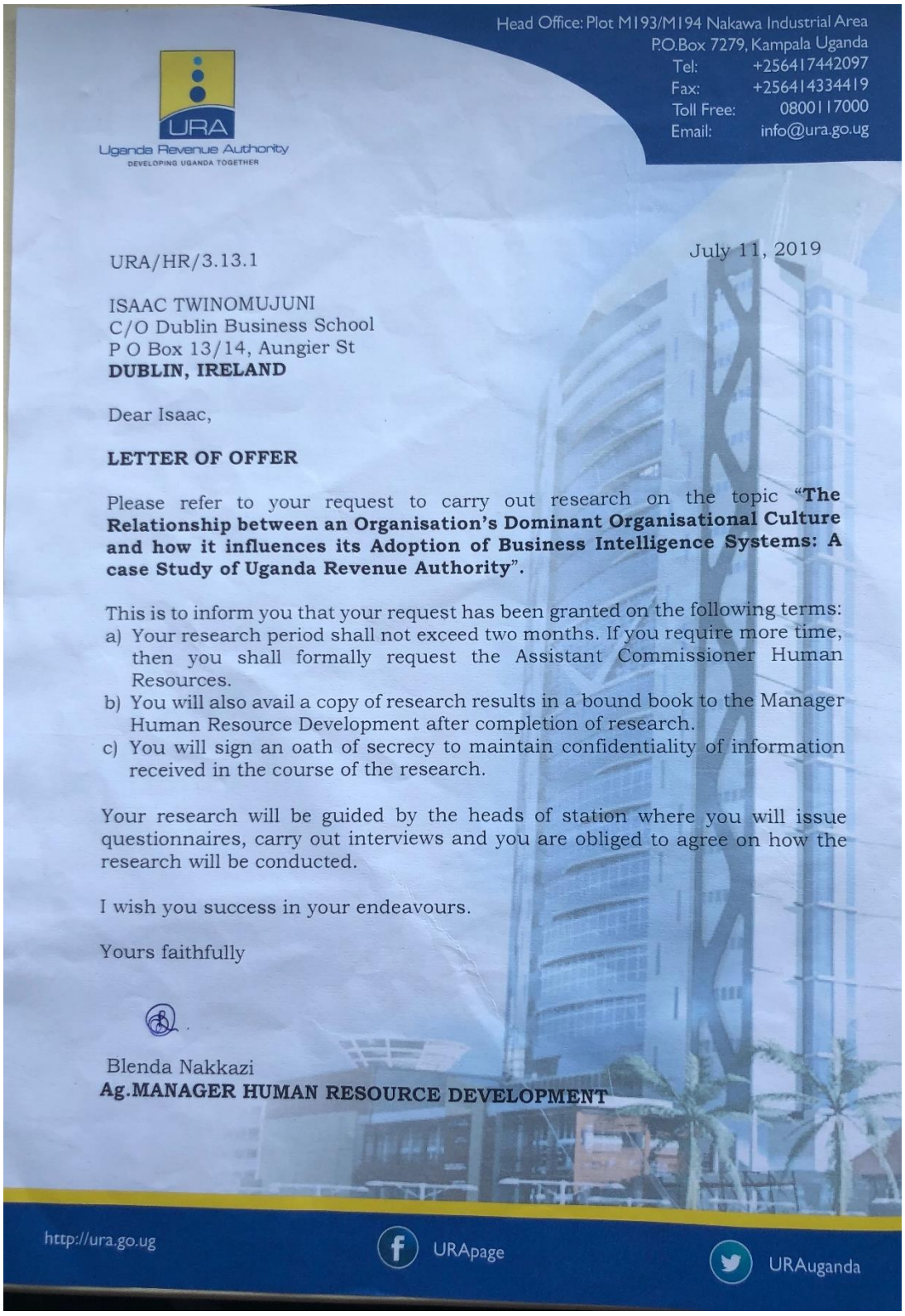
A copy of the questionnaire has been attached to this letter for your reference. The data collected from the assessment instrument will be kept anonymous and confidential. The information provided will only be used in writing my dissertation for my academic requirement.

For further information, I and/or Mrs. Caroline Tansey will be glad to answer your questions about this study at any time. You may contact my supervisor at caroline.tansey@dbs.ie.

Yours Faithfully,

Isaac Twinomujuni
zachtwino@gmail.com
1256 774543200

NSSF a better life
RECEIVED
13 JUL 2019
REGISTRY



Uganda Revenue Authority
DEVELOPING UGANDA TOGETHER

Head Office: Plot M193/M194 Nakawa Industrial Area
P.O.Box 7279, Kampala Uganda
Tel: +256417442097
Fax: +256414334419
Toll Free: 0800117000
Email: info@ura.go.ug

URA/HR/3.13.1

July 11, 2019

ISAAC TWINOMUJUNI
C/O Dublin Business School
P O Box 13/14, Aungier St
DUBLIN, IRELAND

Dear Isaac,

LETTER OF OFFER

Please refer to your request to carry out research on the topic "**The Relationship between an Organisation's Dominant Organisational Culture and how it influences its Adoption of Business Intelligence Systems: A case Study of Uganda Revenue Authority**".

This is to inform you that your request has been granted on the following terms:

a) Your research period shall not exceed two months. If you require more time, then you shall formally request the Assistant Commissioner Human Resources.
b) You will also avail a copy of research results in a bound book to the Manager Human Resource Development after completion of research.
c) You will sign an oath of secrecy to maintain confidentiality of information received in the course of the research.

Your research will be guided by the heads of station where you will issue questionnaires, carry out interviews and you are obliged to agree on how the research will be conducted.

I wish you success in your endeavours.

Yours faithfully

Blenda Nakkazi
Ag.MANAGER HUMAN RESOURCE DEVELOPMENT

Uganda AIDS Commission

Internal MEMO

10th July 2019

To: All Staff

From: Director General

Subject: **Participation in Research Study**

Isaac Twinomujuni an employee of Uganda AIDS Commission is currently on study leave to pursue a master's degree in Ireland. As part of this program, he is undertaking a research study under the topic **"The Role of Organizational Culture in the Adoption of Business Intelligence Systems in Ugandan Public Institutions".**

He has been granted permission to conduct this research study in Uganda AIDS Commission, as the findings of this study could provide insight into the strategic information path of the institution.

This letter is to request you to support him and participate in this research study by responding to a questionnaire tool that he will make available to you.