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Framework for the adoption of e-commerce: A case of South African retail grocery sector

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Abstract

Over the years, the adoption and use of e-commerce have expanded widely in different organisations across the world, influenced by its potential benefits. Conversely, in spite of the benefits that have been commonly and widely reported, there are minimal adoption and use of e-commerce by South African businesses, specifically, in the retail sector. The causes to the limited adoption of e-commerce in South Africa are not known. This empirical study therefore investigates the factors that influence and affect the adoption and use of e-commerce in the mainstream retail grocery sector in South Africa. A retail organisation was selected and used as a case in the study. Actor-network theory (ANT) was employed as a lens to guide the analysis of the qualitative data. Based on empirical evidence, the findings, which include business drivers, stock of knowledge, alliance of actors, training and skills, and assimilation of processes, were found important in the adoption and use of e-commerce. The factors are intended to guide how adoption and use of e-commerce are conducted in the mainstream retail grocery sector in South Africa.

KEYWORDS

actor-network theory, electronic commerce, information and communication technology, retail grocery

1 | INTRODUCTION

Retail grocery sector is arguably one of the most important aspects of most individuals' day-to-day lives. This is due to the nature of the sector, which is to facilitate the provision day-to-day need of goods such as general merchandise and foods to the public, which is essential to human lives. As a result of this, retailers have made available chain stores within different cities, countries, and continents. In efforts to meet the increasing demand placed on them by consumers and gain competitive advantage, retailers have employed information and communication technologies (ICTs) such as e-commerce to enable the selling and buying of their goods and services.

E-commerce can be defined as the buying and selling of goods and/or services, as well as enabling financial transaction over the internet (Cao & Yang, 2016). The adoption of the e-commerce has enabled retailers to increase their physical presence, as well as allowing customers to purchase their products online (Leung et al., 2018). Conversely, it has also helped in reducing operational cost as well as improving customer retention (Kartiwi et al., 2018). Similarly, e-commerce–automated capabilities have helped businesses to increase in their sales as customers' access to goods and/or service through the use of the retailer's website (Ariyani, Hanantjo, & Purnama, 2015).

Irrespective of the type of grocery business, they do depend on or are influenced by common factors, such as people, processes (eg, logistics), and transactions (eg, exchange of commodities) (Saskia, Mareï, & Blanquart, 2016). However, these factors enable and constrain the grocery businesses in one way or the other, such as trading hours, location, additional services, and variety of commodities (Campo & Breugelmans,

2015). For example, irrespective of where a grocery store is situated in South Africa, there are travelling costs to the customers. Also, trading can be inconveniencing to customers, depending on individual customers' schedule.

Some South African retail organisations such as Woolworths and Pick n Pay have employed the e-commerce strategies to facilitate the buying and selling of their goods and services. According to Mlitwa and Raqa (2012), the use of e-commerce by South African grocery stores is mainly to facilitate the merchandising and selling of their products directly to the public. Many South African organisations still rely on the traditional approach, which has caused them to continue to struggle in their zeal and quest to increase productivity, market access, competitiveness and sustainability (Thulani, Tofara, & Langton, 2010). Some South African organisations attribute their lack of e-commerce adoption to factors such as poor internet security, high illiteracy rate, and lack of beneficial legal frameworks (Park & Kang, 2014).

Thus, the objective of this research was to examine the factors that influence the adoption of e-commerce in South African grocery retail businesses. Therefore, a South African retail business was used as a case in the study. Qualitative data were collected from the organisation. The actor-network theory (ANT) was employed to guide the analysis. The research reported in this article is divided into seven sections as follows: Sections 1 and 2 present the introduction and a review of related literature. Actor Network Theory (ANT) was introduced in Section 3, followed by the methodology that was applied in the research is covered in Section 4. In Sections 5 and 6, the analysis of the data and the findings are presented, respectively. The findings from the analysis are discussed in Section 7. Section 8 draws a conclusion about the research.

2 | REVIEW OF RELATED LITERATURE

E-commerce enables trading of goods or services over the internet (Rahman, 2018). The concept of e-commerce is enabled by ICT such as the internet (Zafar, Ishaque, & Javaid, 2014). The concept involves consumers acquiring information and making purchases of goods over the internet (Pavlou & Fygenson, 2014). Some of the benefits that the e-commerce offers to both businesses and customers are ease of access to goods or services and low cost in business activities. Due to the e-commerce automation capabilities, consumers are able to order for goods, the business can process the order online, and financial transactions are effectively made (Kartiwi et al., 2018). Notwithstanding these benefits, South African organisations are slow in embracing the concept (Mlitwa & Raqa, 2012).

In the retail sector, many businesses have reaped the benefits of e-commerce through increased information sharing, time-to-market, supply chain efficiency, and consumers have benefited from the convenience of shopping at any time of the day (Vakulenko, Hellström, & Hjort, 2018). Regardless of these benefits, many businesses are challenged by some factors, which hinder their adoption and use of e-commerce. Park and Kang (2014) highlight lack of ICT infrastructure, poor internet security, high illiteracy rate, and lack of beneficial legal frameworks as some of the challenging factors that hinder many organisations in developing in the adoption and use of e-commerce. Ndayizigamiye and McArthur (2014) argue that some of factors that influence e-commerce adoption in Durban, South Africa, are compatible with technology infrastructure and value.

In South Africa, the online market has shown an increase among its local e-commerce websites. However, only 24% of online shopping were conducted on foreign shopping websites in 2014, which is a reduction from 27% in 2013 and down from 33% in 2012 (Goldstuck & Worx World Wide, 2014). Also, despite the increase in online shopping among its local online stores, online grocery transactions are still currently slow (PwC, 2013). Two of the major retail businesses in South Africa, Pick n Pay and Woolworths (Gauteng Province Treasury, 2012), receive less than 1% of their total sales from their online grocery transactions (Douglas, 2013). In this context, this goes to show that there is a gap in the adoption and use of e-commerce in the mainstream retail grocery sector in South Africa.

3 | ACTOR-NETWORK THEORY

ANT is social technical theory that focuses on actors' interaction and negotiation within networks (Callon, 1987). According to De Albuquerque and Christ (2015), ANT can be defined as a theory that is used as a lens to gain an in-depth understanding of the relations that occur between actors in a social context. In the context of a social world, Heeks and Stanforth (2015) argue that ANT can be interpreted as a practical recursive sociology of process that focuses on how actors can be both human and non-human as well as try to build and maintain networks. Walsham (1997) explains how ANT is used to examine the motivations and actions of groups of actors, which are part of a heterogeneous network of aligned interests. In addition, the theory aims to discover the motives and actions of human actors in an attempt to align their interest around non-human actors (Gunawong & Gao, 2017). One of the main areas of ANT strengths is the translation process (Latour, 2005).

The translation process consists of four stages: problematisation, interessement, enrolment, and mobilisation (Callon, 1987). The problematisation stage is where the focal actor identifies a problem that needs to be addressed (Twum-darko & Harker, 2017). The next stage is interessement in which actors show in the problematised activity (Thapa, 2011). The enrolment stage is where other actors participate in the activities that the focal actor has defined for them in a social system (Heeks & Stanforth, 2015). At the mobilisation stage, a spokesperson ensures that other actors act accordingly to their roles in order to satisfy the of the interest network (Callon, 1987). The interested actors including those who participate in the activities do so either voluntarily or based on contractual agreement (Iyamu & Moloi, 2013).

ANT can be used as a practical recursive sociology of process that focuses on how actors can be both human and non-human as well as try to build and maintain networks (Heeks & Stanforth, 2015). This is most useful in the South African grocery business environment, to gain better understanding of household groceries and economic class participation in e-commerce (Mlitwa & Raqa, 2012). This is also because ANT can be used to provide insights in examining relationships (Avgerou, 2010). The theory is therefore useful as a lens in analysing the interactions and relationship between actors towards transforming socio-technical processes in the adoption of e-commerce in South African grocery sector. According to Walsham (1997), ANT is used to examine the motivations and actions of groups of actors, which are part of a heterogeneous network of aligned interest.

As in other parts of the world, the South African grocery store has multiple actors, of humans and non-humans with diverse culture and interest, which can be classified as network in ANT terms. However, the cultural diversity and economic class in South Africa are unique, which can be attributed to the political history of the country. This therefore requires a detailed examination of interaction and relationship between actors, which ANT presents. Law (2007) argues that ANT is good for the analysis of relationship in the social and natural world in which they are situated. This helps to gain better understanding of the factors that influence and affect the adoption of e-commerce in the mainstream retail grocery sector in South Africa. Mlitwa and Raqa (2012) suggest that the e-commerce concept can be used to improve relationship between consumers and supplier, which is challenging owing to the cultural formation of the South African environment. Avgerou (2010) argues that ANT is needed to identify the relevance and consequences of interactions influenced by "local culture." Walsham and Sahay (1999) explain how "aligned interests are created through the enrolment of sufficient body of allies and the translation of their interests so that they are willing to participate in particular ways of thinking and acting that maintain the network" (p. 42).

4 | RESEARCH METHODOLOGY

Based on the objective of the research, which was to investigate the factors that influence adoption of e-commerce by mainstream grocery store in South Africa, the qualitative methods were applied. This was primarily because the qualitative methods form of systematic and subjective techniques allow and enable things to be uncovered through explanations that is based on social experiences or views (Khan, 2014). The study also employed the case study research design, which enables a comprehensive investigation of a case, with a combination of different evidence sources such as interviews (Iyamu & Moloi, 2013). Dapper chain stores (DCS) was selected as a case based on the following reasons: (a) It was one of the two organisations that partake in e-commerce at the time of this study and (b) access to the organisation was critical, many organisations hardly grant permission for academic studies. "Dapper chain stores" is an alias name because the organisation did not want their identity disclosed.

DCS is one of the major mainstream grocery retailers in South Africa. The first store was opened to the public in 1931; 3 years later, the organisation expanded its stores into Durban, Port Elizabeth, and Johannesburg. The DCS has branches across the southern hemisphere of the Africa continent. The organisation is listed on the Johannesburg Stock Exchange (JSE). The organisation focuses on fashion, cosmetics, and food and grocery retailing. The head office of DCS is situated in Cape Town, Western Cape province of South Africa. This study focused on the e-commerce aspect (units) of the organisation. These units consist of both technical and non-technical units. As at the time of this study, the e-commerce division at DCS was responsible for overseeing all e-commerce activities within the organisation.

The semistructured interview technique was used as the data collection technique in this study. The rationale for this was that it allows subjective views and expression of experiences by the interviewees, and it is thus dominantly used in qualitative studies (Yunos, Mohd, Ariffin, & Ahmad, 2017). Also, the technique enables researcher to have a conversation with the participants in attempts to gain more insights about the phenomena being studied (O'Keeffe, Buytaert, Mijic, Brozovic, & Sinha, 2015). The interviews were tape-recorded on permission and thereafter transcribed. The document containing the data was formatted, with line and page numbers. The participants in the study were assigned code names, to protect their identities as well as for reference purpose during the analysis.

The hermeneutics approach was applied from the interpretivist perspective, in the analysis of the data. The ANT was employed as a lens to guide the use of the hermeneutics approach in the analysis of the data. The rationale for selecting ANT as a lens was mainly because of its focus on actor(s), actor-network, and the four moments of translation: problematisation, interessement, enrolment, and mobilisation. ANT was used to examine the interaction that occurs between human and non-human actors in actor-networks (Twum-darko & Harker, 2017). The theory was used in the following manner:

1. Through the four moments of translation, the theory was employed to investigate the different heterogeneous actor-networks that were formed and how they were formed.
2. To examine the interactions and relationship among actors (both human and non-human) within and between actor-networks.
3. To gain a better understanding of the factors that affect and influence the adoption and use of e-commerce in the grocery retail sector in South Africa.

5 | DATA ANALYSIS

In the use of ANT as lens, both actors and networks that existed were first identified. This was to understand their roles and link them to actions and interactions in the adoption of e-commerce in the organisation. Thereafter, the moments of translation was followed.

5.1 | Actor

Both human and non-human actors play an essential role in the deployment of e-commerce within the DCS. Also, the human actors spread across the business, information technology (IT), and operational units of the organisation. Similarly, the non-human actors were broken into two main categories: information systems (IS) and IT artefacts and process.

Human: From the business unit, the actors included the chief executive officer (CEO), chief financial officer (CFO), chief information officer (CIO), chief operating officer (COO), strategy and business development officer, head of food manager, business managers, and other stakeholders. From the IT unit—software developers, support analysts, business analysts, IT manager, system manager, CIO, marketing managers, online operations manager and online foods category manager, solution architect. The operational unit—these were the operational manager, foods manager, logistic personnel (drivers), pickers, packing personnel, and the customer service personnel. However, the human actors need the assistant of non-human actors in the adoption of e-commerce at DCS.

Non-human: The IS/IT artefacts consist of hardware, software, and network. The hardware included computers, hubs, servers, and other devices. A payment gateway, Oracle e-commerce (ATG), picking application, Retek merchandising system (RMS), support application, and Google analytics were some of the software that existed at the organisation. The technology network was made of wide area network (WAN), local area network (LAN), and switches, which were used to enable the connectivity of units, such as logistics, stores, and distribution warehouses that contributed to the adoption of e-commerce at the organisation. Some of the processes that exist were the picking process, the packing process, and the system evaluation process. The interaction and relations between human and non-human actors were essential and needed in the adoption of e-commerce at DCS.

Due to the newness of e-commerce at the organisation, new processes were implemented to enable the activities of the concept. One of the participants stated that "We had to create a dark store, where stocks were kept specifically for online shopping" (DCS_03, 6:85-86). This dark store was created to handle the process of making goods available to online customers. Actors do not function in a vacuum. This means that both human and non-human actors were involved as networks in the activities of the e-commerce of the organisation. The networks were consciously or unconsciously formed as actors perform their roles and responsibilities.

5.2 | Network

ANT aims to explain social order through networks in which humans and non-humans exist (Shirazi, 2014). Actors do not act outside a network or networks; in other words, actors cannot operate without a network. These network(s) exist because actors exist, and they have a common interest. In DCS, there were networks that existed to enable the adoption of e-commerce within the organisation.

At DCS, the IT unit was an actor-network. The unit was consciously created because it is part of the organisational structure. The IT unit consists of actors such as the online operations manager, online foods category manager, and solution architect. The network employs IT infrastructure to enable the organisation in achieving its e-commerce goals and objectives. Unconsciously, actor-networks were also formed. One of them was group of friends who were involved in the adoption through enabling of the picking process for e-commerce. According to one of the participants, "The food business specifically depends on physical store for customers' ease of access, for walkthrough food picking" (DCS_01, 3:25-28).

Based on individual and groups' roles, and responsibilities, actor-networks were directly or indirectly linked. Some of the actor-networks that were directly linked are the business and operational units. To be able to achieve the business goals and objectives, the business unit relied on the operational unit to perform certain functions within the organisation. On the other hand, a network that was indirectly linked was among the customer service support team and the IT unit. Even though the customer service support team existed before the adoption of e-commerce, the customer service team also helped in giving support to the online customers of the organisation.

Groups of actors from different networks came together to enable the deployment adoption of e-commerce in the organisation. This includes actors from the business unit, IT unit, and operational unit. Also part of the network were the non-human actors such as hardware, system, and software that were used to enable and support the e-commerce initiative. Because these actors were members of other groups, it makes the networks heterogeneous within the organisation. For example, the CIO was in the business unit network and was also part of the IT unit network, which makes both networks heterogeneous.

To achieve the goals and objectives of DCS, which was to successfully deploy and enable the use of e-commerce, the actors passed through a translation process. This consist of the interactions that occur among the actors within networks. In ANT, as has been mentioned several times and discussed in this study, the translation is a process of four moments: problematisation, interessement, enrolment, and mobilisation (Callon, 1987).

5.2.1 | Moments of translation: problematisation

The requirements for the e-commerce adoption were created by the business unit and communicated to the IT and other supporting units of the organisation. Different sets of requirements were communicated to the units because each of them had distinct roles and responsibilities. The unique requirements were difficult to formulate. Also, managing from the deliverables of the various units towards achieving the aim and objectives of the e-commerce was challenging. This was mainly because each of the units also had their interest, which sometimes conflicted with the goal of the unit that formulated the requirements.

One of the requirements that was passed on to the IT unit was the evaluation of resources needed to facilitate e-commerce within the organisation. The requirements were communicated to the IT unit through its head, the CIO. According to one of the participants, "each resource *requires evaluation to assess fit and compatibility from technology perspective*" (DCS_01, 7:159-160). Even though the CIO was responsible for all IT-related activities, the solution architect was assigned the technical tasks. One of the participants stated as follow: "The solution architect is responsible for the implementation of ATG because of the depth of technical skill and knowledge that is needed" (DCS_01, 7:168-170). The challenge was that there was only one solution architect, which means he dictates the design and proposes solution as he wishes. As a result, this brings about conflict of interest in the implementation of the e-commerce systems within the organisation. The conflict had an impact on the communication between actors, and the assimilation of processes and activities.

5.2.2 | Moments of translation: interessement

One of the challenges was the lack of alignment between the business, IT, and operational units, which influenced how and what types of interest were shown in the concept of e-commerce in the organisation. The diverse nature of interests affected rate of interest in the e-commerce by many of the employees. Another influencing factor was various types of knowledge, which some of the stakeholders employed to reach their conclusion about the e-commerce concept. Based on individuals' knowledge, the stakeholders were able to form their perspectives about the e-commerce at the organisation. In the adoption of e-commerce, it was important to align the interests of the stakeholders with their participation. Otherwise, adoption of the concept will be a challenge, and as result, the benefits will not be realised. To emphasise this, one of the participants stated that "We need to keep everyone on the same page all the time. This means keeping the right people from all units aligned with what is going on" (DCS_01, 9:224-225).

Also, interest was based on the responsibility of the operational unit that was to oversee the day-to-day activities within the business in achieving the goal of the e-commerce in the organisation. Some of these activities were the picking of customer's orders, the delivery of orders, and support to customers. It was therefore important for other units and individuals to understand the interest of the operational unit, to shape their own interests. However, at DCS, there was misalignment with the operational unit based on interests from various angles. One of the participants stated that "I think the delivery partner is key as they are solely responsible for contacting customers, so we should align ourselves with the delivery partner" (DCS_03, 7:156-157). Another example of misalignment between the units was different contents in communication with the customer service team. In this case, there was a new store that was opened and there was no communication between the different teams involved. One of the participants described this as "For example, the call centre didn't know a new store was opened" (DCS_01, 8:188-189).

5.2.3 | Moments of translation: enrolment

The implication of having such constant growth and evolving processes can have a negative effect on communication, productivity, and efficiency of the organisation, which ultimately affects the customers' participation in the activities of DCS' e-commerce. One of the participants described an incident: "a supplier can't supply cheese and expect us to do well if we have not informed the food online department. The customers need to be aware of the available goods or items at all times, so that they can participate in trading with us" (DCS_03, 5:75-77). This goes to show that with the growth in teams and evolving process, the understanding and communication within these processes are vital to the adoption and use of e-commerce.

As different actors and networks participated in the deployment of e-commerce in the organisation, it was vital to ensure that processes were well executed to fulfil the objectives. This involved management of both technical and non-technical activities. At DCS, the management of e-commerce activities were challenging, due to three main factors: (a) different levels of understanding, which was based on individuals' knowledge; (b) increasing numbers of different actors and teams that were involved; and (c) combining of both technical and non-technical activities in onefold. As stated by one of the participants: "Growing from 12 people to 80 people has its effect on performance from support perspective. And processes don't survive those type of massive change, so the processes evolve over time, it must work for everyone" (DCS_01, 6:214-1216).

5.2.4 | Moments of translation: mobilisation

At the mobilisation stage, the focal actor(s) ensures that participating actors carry out their tasks accordingly. In DCS, the focal actor(s) ensures that the participating actors participate in the deployment of e-commerce within the organisation contribute to achieving the business requirements, goals, and objectives. These individuals or teams were nominated based on their roles and responsibilities. At the DCS, there was no single focal actor(s) in mobilising individuals and units on the activities of the e-commerce within the organisation. This was due to units' roles and responsibilities in the adoption of the e-commerce in the organisation.

It is unclear as to who was responsible for ensuring that all the stakeholders played their roles and responsibility in the participation of e-commerce. This is due to each of the different units been given a requirement to fulfil, therefore working in silos. According to one of the participants: "The business would have identified the direction and briefed the different teams on what needs to be done" (DCS_03, 4:53-54). Consequently, this can create an unstable network within the organisation in carrying out e-commerce activities as each unit prefers. Despite the lack of clarity as to who mobilises other actors, the different teams can fulfil the business requirements and work towards the organisation's goals and objectives.

6 | FINDINGS AND DISCUSSION

Based on the above analysis by using the moments of translation as lens, five factors were revealed to be crucial in the deployment of e-commerce at DCS: business drivers, stock of knowledge, training and skills, assimilation of processes, and alliance of actors (Figure 1). These factors are discussed in detail in the following sections.

6.1 | Business drivers

In many organisations, ICT is used as an enabler to support business strategies, goals, and objectives (Agboh, 2015). The goals, objectives, and strategies are collectively created form the business drivers. Some organisations base their motivation on for the selection, deployment, and use of IT artefacts for business drivers. Thus, the business drivers of the organisation prescribe how e-commerce is adopted and used in an organisation. In addition, the business drivers include requirements from both IT and business.

In other words, the goals, objectives, and strategies form key components in the deployment of technological innovation such as e-commerce. In the case of DCS, e-commerce adoption and use were part of the organisation strategy to attract more consumers and grow their market share in the retail sector, and ultimately increase profitability although the designing of the business drivers was challenging, because they were created by various actors on behalf of the organisation. Some of the actors agreed and others disagreed with the deployment of e-commerce within the organisation. The decisions made by the different actors were based on two main aspects: (a) an understanding of e-commerce in relation to the business drivers of the organisation and (b) personal interest as opposed to the business drivers of the organisations.

From individual's perspectives, some employees felt that the adoption and use of e-commerce would not benefit their personal interests. This was based on the fact that some of the employees would have limited control over a few resources. Furthermore, they may not be involved in the actual activities that occur in the adoption, which would make them less required in the organisation. The transformative process that was brought by the adoption and use of e-commerce was the bases of the fears of the employees at the time. The interest of the different

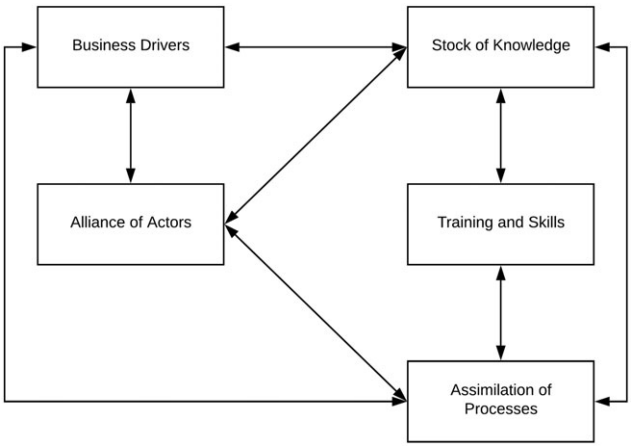

FIGURE 1 Factors influencing e-commerce

actors was relevant as they exercised power, which was bestowed on them based on the organisation structure, thus making them influential in the decision-making process.

6.2 | Stock of knowledge

The knowledge of the different actors is key in the deployment of ICT artefacts in an organisation. This comes from different areas such as strategic, business, operational, and technical perspectives. Collectively, this creates a stock of knowledge within the organisation, which in turn is used to enable the selection, deployment, and use of ICT artefacts such as e-commerce. For example, at DCS, based on the knowledge of the solution architect, the ATG e-commerce system was acquired and implemented. This goes to show that the knowledge from these different areas of expertise plays a vital role in the deployment of e-commerce in the organisation.

Knowledge sharing by the different actors who were involved in the implementation and use of e-commerce was challenging. This was mostly because actors use the knowledge they had to negotiate their personal interest as opposed to the business drivers of the organisation. The implication of this was that there were limited documentation on the implementation and use of e-commerce within the organisation. Furthermore, knowledge was used by actors as bargaining power to achieve their own personal interests.

This type of practice is not new. According to Satish and Anand (2016), the absence of documentation can result in the wastage of time resources on gathering information before making changes to a system or software. The consequence of the lack of documentation on the selection, implementation, and use of ICT artefacts can affect the maintenance of innovation as well. Subsequently, this has a negative impact on the efficiency of the IT unit and ultimately the organisation. Thus, in knowing this, actors, therefore, use their knowledge as negotiating power to exercise control over the adoption of e-commerce within the organisation. Some employees in an organisation believe that knowledge is power and in sharing this knowledge, they may lose their power or position within the organisation. Thus, some actors have an undesirable attitude towards the sharing of knowledge to protect their personal interest (Qureshi & Evans, 2015).

Therefore, managing knowledge becomes important for the organisation. The stock of knowledge acts as an enabler for the organisation to improve the productivity of processes, provide excellent service delivery to their customers, and ultimately find new innovations towards the organisation's goals (Donate & Sánchez de Pablo, 2015). The management of knowledge can be accomplished through the use of training guides, process and policy documents, and workshops for an innovation (Dave & Koskela, 2009).

6.3 | Alliance of actors

In the selection, implementation, and use of ICT artefacts, the alignment of the different actors plays a key role within an organisation. Therefore, the different units collaborate to enable different activities and processes towards achieving the organisation's goals and objectives. For example, at DCS, a customer has placed an order for good through the organisation's website; the order was sent to the operational unit's picking team for onward delivering to the packing team, thereafter to the logistics personnel. Thus, actors were consciously and/or unconsciously part of heterogeneous alliance of networks in the direction of the business drivers of the organisation.

The consequence of the lack of alignment between the different actors can have a negative impact on the efficiency of the organisation. At DCS, there was a new store that was opened, and the operational unit was not aware of this. As a result, employees of the operational unit were knowledgeable enough to provide support and assistance to customers in the process. The lack of alignment was a result of poor communication between the different actors involved in the adoption of e-commerce at the organisation.

Communication plays a vital role in the implementation of new systems within an organisation. The lack of good communication among stakeholders can have a negative influence on the sharing of knowledge within an organisation. According to Charoensuk, Wongsurawat, and Khang (2014), communication has an indirect connection with the alignment between business and IT through the sharing of knowledge. Therefore, quality communication, in the formulation of problems, needs, and sharing of knowledge within an organisation, can otherwise increase productivity and efficiency in the organisation. Thus, business, IT, and the operational unit can collaborate in the direction of achieving the organisation's goals and objectives.

6.4 | Training and skills

In many organisations, the selection, implementation, and use of ICT artefacts hang on having actors (employees) who are trained and skilled. The reason for this is often, actors need to have better understanding about the technical standards and processes that are involved in the selection, implementation, and use of ICT artefacts in their organisations. According to Salehan, Kim, and Lee (2018), training is essential for the adoption of new technology in an organisation. Consequently, training helps to bridge the gap between actors in their unequal levels of understanding and upskilling.

This means that to understand the different processes, standards, and policies involved in the adoption and use of e-commerce, training and skills are highly recommended. However, the implication of the lack of well-trained and skilled employees in the adoption and use of e-commerce can have a negative impact on the organisation. At DCS, some employees did not know that after picking an order, the order needs to go through a quality check before it is delivered to the customer. The significance of training in the adoption and use of e-commerce within the organisation is to create a common understanding of the different systems and processes relating to the e-commerce activities. Training materials and programme can help reduce challenges and increase assimilation of processes in the implementation of new technologies (Ram, Wu, & Tagg, 2014). Some ways in which training can be done is using documentation, training manuals, workshops, seminars, and knowledge management strategies.

6.5 | Assimilation of processes

The assimilation of processes involved in the deployment of new technology artefacts in an organisation is key success. This primarily because the assimilation of processes is seen as the understanding of processes, which begins from the awareness of an innovation to the adoption and use of it (Pudjianto, 2010). The processes include investigations, analysis, evaluation, and implementation of new technology artefacts to enable and support business processes (Hossain, Quaddus, & Islam, 2016). The absence of process assimilation can have an undesirable influence on the adoption and use of technological artefacts. The lack of process assimilation can be attributed to factors such as inadequate skills and technical knowledge of the technological artefacts (Al-Somali, Gholami, & Clegg, 2011).

For instance, in the implementation of new technologies purposely to enable business processes, the lack of understanding of the business processes can impact the procurement of new systems. As a result, selection and implementation of such systems are subject to fail due to the lack of adequate skills and knowledge (Van Wart, Roman, Wang, & Liu, 2017). Thus, assimilation of different processes is important in the procurement, deployment, adoption, and use of e-commerce to accomplish competitiveness.

7 | INTERPRETATION OF THE FINDINGS

The factors that influence and affect e-commerce adoption and use were empirically revealed through findings as presented in the analysis section above. This section presents the interpretation and discussion of the findings, on which the development of the framework (Figure 2) was based. The framework is to provide guide on the adoption and use of the e-commerce concept in the mainstream retail grocery sector in South Africa.

The findings from the DCS case were subjectively interpreted. The interpretation of the findings reveal four main factors. The factors can assists to gain an in-depth understanding of how e-commerce adoption and use are influenced and affected in the mainstream grocery sector in South Africa. The factors are organisational requirements; network of people; technology architecture; and culture.

7.1 | Organisational requirements

As revealed through the analysis of the data, it is vital that the business drivers of an organisation are understood by the actors that are involved in the adoption and use of e-commerce. In this study, business drivers consist of and refer to strategies, goals, and objectives. The rationale for this was that the business drivers were in conjunction with both business and technical (IT) requirements, informing the way in which e-commerce was adopted and used within the organisation.

The business requirements need to be clearly defined and understood by the different actors involved in the deployment of e-commerce within the organisation. This is primarily because the requirements determine what decisions are taken in the implementation of systems, as well

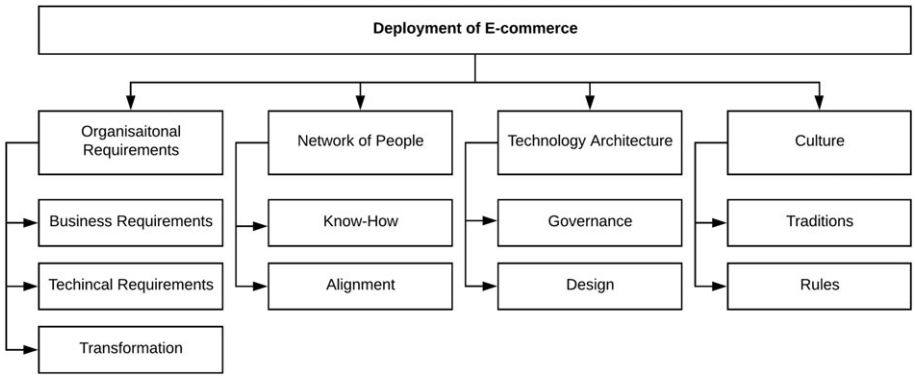

FIGURE 2 Framework for the adoption of e-commerce

as the processes that are followed in the organisation. The business requirements ensure that systems and processes implemented in the adoption and use of e-commerce are executed in an effective manner. The importance of understanding the business requirements helps in justifying the rationale behind the use of e-commerce in the organisation. In addition, technical requirements are needed to enable and support the e-commerce concept within an organisation.

The technical requirements are defined and gathered based on the business requirements. This is because technology enables and supports the e-commerce initiative within the organisation. The requirements cover technology artefacts such as systems (software), infrastructure, and networks including integration of systems. The requirements are used as guide to ensure that the development or acquisition of a system and its implementation aligns with the business drivers towards achieving the goals and objectives of the organisation. The significance of clearly defining business and technical requirements is, therefore, to ensure that the deployment of e-commerce is executed properly. This is mainly because the deployment of e-commerce affects other decisions taken within the environment, such as the implementation of new processes and the acquisition of systems, towards achieving the organisational goals and objectives. In addition, the implementation of new processes and systems can bring a transformative process within the organisation.

Transformation can be consequential in the implementation of new systems and processes within an organisation. The implementation of new systems and processes can also result in the re-evaluation of workflows and processes in an organisation. Therefore, changes can potentially be made to existing processes and systems or in the integration of existing with new processes and systems. In addition, through the transformative processes, the organisation can define and clarify different processes and tasks for actors to gain better understanding towards correct execution of processes and tasks in achieving business goals and objectives.

7.2 | Network of people

In the adoption and use of e-commerce, it is important that the involved actors have the necessary skills and align with one another's thinking towards achieving the organisation's goal. This is because know-how and alignment are critical factors in the effective and efficient adoption and use of e-commerce. The lack of knowledge (know-how) of the different processes involved in the adoption and use of e-commerce can result in unproductivity.

In a study by Shang (2012), it was revealed that inadequate knowledge about new system processes can affect the productivity of the organisation. It is therefore important that stakeholders gain some knowledge about the processes that are involved in the adoption and use of e-commerce. However, due to the distinct backgrounds of the stakeholders, which are of technical (IT) and non-technical (business) nature, it is difficult manage the process. This is attributable various focuses and understandings of the processes within the organisation. Consequently, there is a need to ensure that actors are aligned in relation to the know-how, understanding, and processes involved in the deployment of e-commerce.

The alignment of the actors from both technical and non-technical viewpoints is vital in the adoption and use of e-commerce within an organisation, as actors heterogeneously collaborate between units, teams, and departments. The rationale for this is to ensure that each actor can work together using their knowledge towards achieving the goals and objectives of the organisation. The lack of alignment between actors can affect the organisation in a negative way, such as duplication of processes and increase in the cost of integration of new systems. Therefore, it is important that actors have knowledge about the e-commerce concept for alignment purposes towards achieving the organisational goals and objectives.

7.3 | Technology architecture

The development, deployment, and use of e-commerce technologies require technology architecture that provide and guide design and governance. The architecture is purposed to ensure and promote uniformity, compatibility, and flexibility. This is wittingly to provide the e-commerce concept with better management, enhanced stability, and compatibility. Consequently, the architecture enables the organisation in the development or acquisition of systems to facilitate e-commerce within the organisation. Therefore, the design of the technology architecture needs to be flexible to accommodate the business processes of the organisation. The rationale for this is that this will ensure that the systems that are deployed to facilitate e-commerce can work according to the business process of the organisation. Thus, it is important that the business processes need to be clearly defined and understood by the actors involved directly or indirectly in the adoption and use of e-commerce within the organisation. In line with this, there is a need for a structure which is used to govern the acquiring of systems, processes, and procedures that its employees need to follow in the deployment of e-commerce.

In addition, the governance entails processes and procedures that guide the development or acquisition of systems for the e-commerce concept. This is also vital in that governance, in that it provides stability through standards for the deployment of e-commerce in an organisation. Furthermore, the governance of the technology ensures that there is consistency in the systems and processes within the organisation. Thus, it is important that actors involved in the deployment of e-commerce are aware and understand the standards, processes, and procedures. In the case that different actors, units, and departments do not adhere to these standards, processes, and procedures, challenges are bound to occur from acquisition of systems to facilitate e-commerce.

The design of the technology architecture needs to focus on getting its requirements from the business processes, for effectiveness and efficiency purposes. Therefore, the business processes, on its own, need to be clearly defined and understood by the actors. Once the processes have been clearly defined, the governance of processes, procedures, and systems can provide ease of use for rules in governing the deployment of e-commerce within the organisation.

7.4 | Culture

Culture plays a key role in the adoption and use of e-commerce in an organisation. The reason for this is that culture impacts how tasks or processes are executed within the organisation. Thus, culture influences how actors carry out different processes in the deployment of e-commerce within an organisation. Culture can be informed by rules and traditions that exist within the organisation. Rules set the boundaries in the way practices and processes are carried out within an environment. Also, rules can be used to complement different practices and processes in an organisation. For example, in the adoption and use of e-commerce at DCS, rules tagged Request of Proposal (RFP) were followed in acquiring systems. Thus, the rules complement processes of acquiring new systems in the organisation.

Rules can be written or unwritten. Written rules are in documented text, which covers both business and technical activities and events in an organisation. Written business rules are guidelines that are established by the business to facilitate the different processes within the organisation. These rules can be formulated to suit the business drivers within the organisation. An example of a business rule would be that, before new business models are implemented, there is a need for a strategic meeting to evaluate the necessities and implications. Written technical rules are often used to ensure that technologies deployed to facilitate the e-commerce concept are aligned with the business drivers of the organisation. In addition, rules can be included in the specification document, technological standards, and/or usage policies of the organisation. An example of this is a rule that ensures that new systems acquired can be flexible to integrate with existing systems in the organisation.

This goes to show that rules are used to govern compliance by actors across the organisation in the adoption and use of e-commerce. However, some of the rules are not always formal and/or written. Unwritten rules are part of the customs or informal culture of an organisation. These are rules that have been sanctioned by an actor or actors based on perceived usefulness and the power to do so. An example of a unwritten rule was at DCS; even though a decision was made by the department to acquire a system, the power to execute or decline vested on the IT manager without further makes the decision without consultation. Thus, the impact of rules on the adoption and use of e-commerce in an organisation can be negative if not governed properly by the organisation. It is vital that rules are governed to ensure that actors involved in the adoption and use of e-commerce adhere to rules, to ensure that the business drivers are fulfilled.

8 | CONCLUSION

In conclusion, based on the empirical evidence gathered from the analysis, through the application of ANT in this study, there are five factors that critically influence the adoption and use of e-commerce in the mainstream retail sector in South Africa. As discussed in Section 7, the factors are organisational requirements, network of people, technology architecture, and culture.

The benefit of this study can be viewed from two main fronts: South African retail stores' and academic perspectives. Due to the limited literature on the adoption and use of e-commerce in the retail sector in South Africa, this has attributed to the minimal adoption and use of e-commerce by the retail stores. To this end, this study benefits the retail stores as provides in-depth insight on the activities, which occur in the deployment of e-commerce in an organisation. Furthermore, this also highlights the factors in which retail stores need to be aware of towards making informed decisions on how e-commerce technologies are selected, implemented, adopted, and used in the mainstream retail grocery sector in South Africa.

The study also benefits the academic domain, as this study can be used as a case material towards the development of teaching and learning. Due to minimal literature that exists on the adoption and use of e-commerce in the mainstream retail grocery sector in South Africa, this study, therefore, contributes as literature to the existing body of knowledge. Furthermore, based on the empirical evidence presented in this study, this study provides a foundation in which researchers can build on towards the continual development of e-commerce, beyond mainstream retail grocery sector in South Africa.

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