



**IMPACT OF INFORMATION TECHNOLOGY INVESTMENT IN A SELECTED SMALL BUSINESS
IN THE WESTERN CAPE, SOUTH AFRICA**

**(Proposed change: Information technology investment in a selected small business in the
Western Cape, South Africa)**

by

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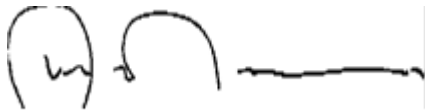
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A handwritten signature in black ink, consisting of a stylized 'A' followed by a series of loops and a horizontal line.

Signed

29/10/2022

ACKNOWLEDGEMENTS

My deepest gratitude and appreciation go to:

- To Excellent Meat forgiving me the opportunity to do a case study on their organization.
- To all the willing participants for participating in the interviewing process.

DEDICATION

I would like to dedicate this study to my supervisor.

Dedicated to : Prof Retha de la Harpe

Thank you so much for all your support. Without you I wouldn't have been able to obtain my degree .

ABSTRACT

For this study, the researcher focuses on decision-making of IT investments in an organisation. The objective of the research is to determine how investment in IT affects decisions in the organisation and what IT investments enable decision-making in an organisation. Although the strategic value of IT investments has been addressed, practical guidelines to support the management of IT investment appear to be lacking that defines the problem. Semi-structured interview questions were used to collect data from 12 participants with the case a single organisation in Cape Town. The environment in which the organisation operates makes it suitable for a case study. The contribution of literature was important to the research to determine the current status of decision-making regarding IT investments. The findings validate a significant role that real-time data plays in supporting decisions in the organisation. Reporting based on the data could assist in improved planning, forecasting and in the long run, performance of the organisation with good investment in IT. The study revealed that the adoption of new hardware, network architecture improvement and the implementation of new databases influence decisions about IT investment. A recommendation is that the organisation take advantage of findings to focus on becoming more competitive in its environment. It is also suggested that more emphasis be given to the network platform and architecture before any decisions are made on any new application in the future. It can be concluded that the implementation of new hardware should form part of the strategic decisions.

Keywords: IT investment, decision-making, real-time data, hardware, network architecture, database

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ABBREVIATIONS/ACRONYMS

ANC	African National Congress
DoE	Department of Education
DOE	Department of Energy
DSS	Decision Support Systems
ERP	Enterprise Resource Planning
ES	Executive Support (Systems)
IDM	Improve Decision-making
IE	Improve Efficiency
IF	Improve Flexibility
IM	Improve Planning
IO	Improve Operations
IPP	Improve Productivity/Performance
ISO	International Organization for Standardization
LMI	Less Maul Intervention
MM	Matrix (in-house business system)
TAM	Technology Acceptance Model
TTF	Task Technology Fit
VOIP	Voice Over Internet Portal
ICT	Information and Communications Technology
MIS	Management Information Systems
TIA	Technology Information Agency
STRADEC	Strategic Decision

GLOSSARY

Epistemology	The philosophical study of the nature, origin and limits of human knowledge.
Etymology	The study of the origin of words and the way in which their meanings have changed throughout history.
Variable	Something that is not consistent; something that is liable to change.
Paradigm	Typical example or pattern of something; a pattern or model.
Ontology	Assumptions about the nature of reality.
Delineation	The action of describing or portraying something precisely.
Participant	A person who takes part in something.
Methodology	A system of methods used in a particular area of study or activity.
Purposive sampling	A sampling technique in which units are selected because they have characteristics that are required in the sample.
Research strategy	A step-by-step plan of action that gives direction to thoughts and efforts, enabling research to be conducted systematically and on schedule to produce quality results and detailed reporting.

CHAPTER 1: RESEARCH ORIENTATION

1.1 Introduction

The existing world is subject to consistently remarkable changes in information technology (IT). Furthermore, as noted, these continuous changes, innovations and new technology upgrades affects organisations and individuals on any platform. Yet the value of IT investment in any organisation has positively affected all aspects of the organisation. Moreover, IT increases the value of the organisation by giving it a competitive advantage, efficient use of resources, profitability improvement, improved work output and enhanced productivity. As organisations become more digital, there are a number or aspects to consider, including digital interaction, technology, facility, environment and security (Alsufyami & Gill, 2022).

In this chapter, the researcher will briefly discuss the background of this research, explaining the problem statement, the research objectives, and the research questions which are subdivided into primary research questions and secondary questions.

The purpose of this thesis is to investigate the impact of IT investment on decision-making in an organisation. Furthermore, it aims to investigate which factors are impacted by IT investment on decision-making in the organisation.

Upon deeper investigation, the researcher intends to identify the challenges and benefits experienced by the organisation. Most importantly, the research has indicated that ethical considerations were adhered to as set of research ethics that guided the research design and performance.

The delimitations of the study were that the study was confined to one company as the research approached was a case study. At the same time, the researcher reveals that the study will focus on only 12 participants from business units within the selected organisation. This research is to investigate the impact of IT investment on decision-making. The study explores external and internal factors, while focusing primarily on the impact of IT investment on organisational decision-making. It is understood that the topic of decision-making has been widely researched by various academics and researchers in the field of decision science. Wang (2006:13), for example, claims that there are four stages in the decision-making process: analysis and planning, evaluation of costs and benefits, selection and implementation, and post-implementation evaluation.

As discussed, the aim of this study is to investigate the impact of IT investment on decision-making in the organisation. In the next section, we discuss the background of this study.

1.2 Background to problem statement

In this chapter, the researcher will briefly discuss the background of this research, explaining the problem statement, the research objectives, and the research questions which are subdivided into primary research questions and secondary questions.

As discussed in the introduction, technology has become exceedingly important in modern organisations. Without the existence of IT, an organisation cannot function as a business. Most importantly, the alignment of information technology (IT) and the business goals (hereafter referred to as 'alignment') is crucial to the success of organisations. As stated by Liu and Chen (2004:3) considering information technology from the organisation's perspective, information technology is used to improve the efficiency and effectiveness of an organisation by reducing the bounded rationality of decision-making. In future, priorities should focus on technological and managerial aspects to deal with contemporary management challenges with regard to an organisation's IT investment (Stamoulis, 2022).

In terms of investing much in technology, this hazard can have a negative effect on the organisation. System errors which are currently experienced in the organisation are dependent on external consultants. So this should form part of the organisation's strategic planning. A highly specialised permanent full-time individual should be available on site to support and liaise with the owners of the current ERP system. This will lessen the time taken to fix errors and will also be cost effective.

The main objective of this paper is to investigate the impact of decisions in a selected organisation. It also points out the level of IT employed in the organisation for decision-making in the Western Cape. Ismail clarifies that business in South Africa is not only seen as the engine of economic growth and productivity but is also seen as a means of allocating income generated from the organisation to its employees and their affiliates (Ismail et al., 2011). According to Ismail et al. (2011), businesses play a very important role in the South African economy.

According to Johnston et al. (2008:1043), the adoption of new technology specifically in the Western Cape shows a wide range of technology in use in businesses, with 88% using networks, and 70% using some form of customer relationship management software. Johnston et al. (2008:1043) further comment that when the individual-to-computer ratio is calculated, 78% of all organisations in the Western Cape show a 1:1 (person-computer) ratio. Johnston et al. (2008:1043) also analyse spending relating to the three technology sectors (services, hardware

and software). According to Johnston et al. (2008:1043), most organisations indicated no change in their spending behaviours. It was, however, further noted that there was a 30% increase in both hardware and software spending. Johnston et al. (2008:1043) claim that most organisations are aiming to adopt more technology in the future, and that most organisations reach significant amounts of value by using technology in the organisation.

According to Onn and Sorooshian (2013:139), IT is a combination of hardware and computer software that supports an organisation's management strategies and also the operations of the organisation. Likewise, they suggest that another advantage of utilising IT in the form of computer applications is the positive benefit to the organisation of increased productivity (Onn & Sorooshian, 2013).

As reported, business firms enjoy a range of opportunities when implementing new IT-enabled initiatives; many of which have at least a theoretical potential to increase productivity and profitability for the business. Kim and Sanders (2002) contend that IT investments improve the efficiency and effectiveness of an organisation and also positively impact performance factors of value activities directly and indirectly. It has been noted that the IT investments in the selected organisation for this study are Matrix (MM) business system (in-house software) and scanning tools. It is also mentioned that the implementation of label printers and voice over internet protocol (VOIP) improve communication both internally and externally.

As pointed out, each business unit has its own specialised work output and with IT investment, the current environment becomes more specialised as more special skills are required. The organisation is required to upskill workers effectively, especially when they are required to operate the current ERP system. According to Ghobakhloo et al. (2011:67), small organisations do not have the specialised expertise and skill to support specialised software or applications. Ghobakhloo et al. (2011:67) also contend that advanced technologies require the engagement of consultants to support specialised applications, and for many small business, this is just not possible.

It is also noted that there are many issues surrounding hardware-related errors. According to Rezaei et al. (2014:1210), IT consists of a wide range of equipment, desktop technology tools to operate computers, data storage, different types of communication tools and networking applications. There are also services used by organisations to create data and knowledge; and sometimes IT systems are not able to survive without creating an information production culture. Therefore, the most important aspect of IT is an information-oriented way of thinking (Rezaei et al. 2014:1210).

As pointed out, in the modern world the two most important components driving a business are hardware and software. A significant volume of software and hardware were invested in the organisation under study in this research. As revealed, the hardware that was currently implemented was generally done so from a communication point of view and not used to run specific applications. Thus, it is important to note that all hardware in the organisation is implemented on an ad hoc basis. It can be concluded that more emphasis should be given to the network platform and architecture before any decisions are taken.

Ejiaku (2014:59) states that information technology (IT), coupled with other support and housekeeping, can be maintained by training and maintenance of the organisation's infrastructure configuration, installation and demands design for the organisation to operate successfully. IT makes the management of information more efficient and effective. The other challenge to the organisation for the nearly constant necessity to improve the business environment is having access to finance. It was also noted that some of the top-level management needed to transform ideas into businesses and learn from failure.

The current organisation's information technology (IT) infrastructure can be described as somewhat advanced since it consists of voice over internet portal (VOIP), computers and software that are necessary to facilitate efficient data transfer and management. Having an in-house ERP system requires an on-site specialised IT expert to support it. The production environment in the organisation consists of different production plants, for example, fresh meat, deli and wholesale.

Drawing on the reviewed literature and the discussions in the background section, it was important to conduct a research study on the impact of information technology investment in this selected organisation. In the section which follows, the researcher briefly explains the problem statement of this study.

1.3 Problem statement

The problem statement for this study defines the impact of IT investment on decision-making in the organisation. The impact of information technology investment on decision-making in the organisation is not completely acknowledged or recognised. Yet we find that the organisational environment is continuously changing the way the business operates as the environment is increasingly becoming more digitised (Stamoulis 2022). However, managers need to scan the environment before any decision is taken regarding investing into IT. The aim is to find and investigate the impact of IT investment on decision-making in the organisation. There is a direct relation between technology, investment and business (Dong et al. 2021), so IT plays a significant

role in the business environment and global economy (Ji et al. 2021). The reason for such investments concerns certain factors such as the increased globalisation of markets, increased environmental concerns and technological advancement towards digital transformation (Skare & Soriano, 2021). Data from several sources have been identified in today's global market whereby no production or business could endure without being at the forefront of technology. A relationship exists between business growth and IT investment (Uhlig & Remané, 2022). Most importantly for this research is an exploration into the manner in which investment in IT affects and supports decision-making in the organisation (Stamoulis, 2022). Although the strategic value of IT investments has been addressed, practical guidelines to support the management of IT investment appear to be lacking (Ilmudeen et al., 2022).

1.4 Purpose statement, key research questions and sub-questions

The most important reason for this study is to investigate the impact of IT investment on decision-making in a selected organisation in the Western Cape of South Africa. It is important to note that managers in the organisation are facing various serious challenges with IT investment.

1.4.1 Research questions

The main research question is as follows: *What are the views of decision-makers that influence their IT investment decisions in an organisation?*

The main research question is supported by two sub-research questions to guide the data collection and analysis. The sub-research questions are as follows:

Sub-research question 1: *How do IT investments influence the organisation?*

Sub-research question 2: *What IT investments enable decision-making in an organisation?*

1.4.2 Aim of study

The aim of the study is to explore the views of the decision-makers in a specific organisation to establish how their decisions influence the organisation's IT investment.

1.4.3 Objectives of study

The objectives of the study are linked to the sub-research questions to guide the formulation of the interview questions. The case is a specific organisation in Cape Town, South Africa.

Research objective 1: To determine how IT investments influence decision-makers in an organisation. The research method to meet this objective is semi-structured interview questions to collect data from 12 participants.

Research objective 2: To establish what IT investments influence decision-makers. The same method with semi-structured interview questions was employed to collect data.

1.5 Research methodology

In this section, the researcher will highlight the methodological framework used for the study. Key issues, such as which method was employed to carry out the investigations to focus on the research objectives, are discussed. This encompasses the approaches adopted for the research, the type of knowledge that the research aims to generate, the kind of data collection to be used, and lastly, a clear indication of how the interview questions were constructed and the credibility of the research.

The research is based on a single organisation. As stated by Saunders et al. (2019), an exploratory study consists of finding out “what is happening; to search for new insights”. This method is suitable for this study as the intention is to explore how IT investments influence decision-making. In presenting an explanatory study, a researcher looks at a particular state of affairs or problem as it happens in practice.

Saunders et al. (2019) state that research philosophy plays an important role. Positivism, realism, interpretivist and pragmatism, as the first layer of Saunders et al.’s research onion, definitely impacts the way in which the researcher thinks about the research process. An interpretative paradigm was adopted for the study under investigation as that is suitable for exploratory research.

Saunders et al. (2019) explain that *ontology* refers to assumptions about the nature of reality. As for this research, reality is considered as that which is perceived by the participants. As such, this study uses semi-structured interview questions to collect data from participants on various levels of an organisation.

As to the research strategy, a case study was chosen. This specific case dealt with the impact of IT investment on decision-making of the operators (participants) within the organisation. The organisational environment in which they operate renders it ideal for a case study.

It is important to observe the data collection process in respect of the interviewing as interviews will form the key method for data collection with the intention of learning more about the decision-making processes. According to Saunders et al. (2019), semi-structured interviews are used to collect qualitative data to encourage participants to share their views.

The population used in this study was from different business units within one selected organisation. The study selected 12 participants who work with and use different types of technology as part of their work with the organisation.

The study uses a thematic analysis approach to code the responses to find patterns in the answers. Important for ensuring reliability of this study, the responses were obtained through the interviews using the same set of questions for each interview.

1.6 Ethics

In this section, the researcher will discuss the ethical considerations which relate to this study. According to Saunders et al. (2019), research *ethics* can be referred to the way we formulate and clarify our research topic by focusing on the following: collecting the data, analysing data, storing the data of the findings, accessing the data, and writing up our research findings in a responsible and ethical manner. Daniel (2016) explains that research integrity depends on how the researcher approaches and designs the research. Thus, it is important to observe that this study will only focus on participants from inside the organisation within different business units. The participants consist of individuals in top management down to the basic operator who are all affected by the investment of IT. Furthermore, it was important to obtain a written letter from the organisation's top management. Participants who will participate in the study will be advised in writing of the purpose of this study. According to Denzin and Lincoln (2005: 96), integrity is all about the ethics, and ethics is all about codes of conduct which direct the researcher in interaction with the participants and secondly, in professional rules (Daniel, 2016).

The researcher will follow the ethical strategy as stated by Saunders et al. (2019): to maintain the privacy of the actual participants; to ensure the participants who are participating in the interview are doing so voluntarily; to have the full consent of each participant; to ensure that the information provided by the participant will be kept confidential; to not cause any detriment to any participant in any way; and to ensure the reliability of the research. The next section provides a brief discussion on assumptions in this study.

1.7 Delineation

As discussed in the previous section, ethical considerations ensure that the guiding principles of the organisation are followed. For this study, the researcher focuses on a single case study for a specific organisation. Furthermore, the organisation in which the study is focused is situated in the meat industry in the Western Cape, South Africa. As pointed out previously, a selection of 12 participants from different business units will be selected. Most importantly, the participants

selected are all working with IT-related functions within their respective business units. For this study, the researcher will focus on investigating the impact of IT investments. Results from this study are not generalisable since it provides the views of only one organisation. Furthermore, the procurement, implementation and adoption of IT are not considered.

1.8 Conclusion

It is important to establish a link between business investment and technology. Therefore, the research is used to reveal the evidence concerning technology as a tool through which a business can grow. Moreover, the research will consider how IT investments influence the performance and productivity of participants in an organisation.

1.9 Contribution

We live in a technologically-rich world known as the 'information age' and yet it could be said that we still face many of the same problems surrounding technology. In this section, the researcher discusses the contribution to this study. The findings will show how investment in IT plays a significant role in decision-making. Furthermore, findings will suggest how an organisation such as this particular one can benefit from an IT investment. The research contribution to this study is to show how IT investments impact decision-making in accordance with relative literature. Moreover, as mentioned, comparing current literature relating to this topic to the scenario of the organisation that we will discuss in the thesis will provide a more in-depth understanding as to *why* and *how* the problem exists.

1.10 Chapter layout

This thesis consists of six chapters. Chapter 1 consists of the background, research question and problem statement. Chapter 2 consists of a literature review. In Chapter 3, the research methodology is discussed in terms of research design, research approach and research purpose. Chapter 4 describes the field work and analysis of all the findings. Chapter 5 contains discussions and recommendations. And finally, Chapter 6 presents the conclusion, suggestions for further research, and the researcher's reflections on the research study.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

In the 21st century, we find that most businesses depend on commerce to survive in their industry. The researcher uses Excellent Meat as case study to define what impact IT investment will have on decision-making in the organisation. According to Ghobakhloo (2012:37), the modern economic environment is controlled by narratives such as knowledge, availability of real-time data and competition which have transformed the way organisations conduct business.

In this section, the researcher will discuss and outline the theoretical structure in achieving the research objectives. The researcher's aim is to present the chosen theoretical structure and justify why the chosen structure suits in the researcher's quest for answering the research objectives.

Chapter 1 presents the background, problem, aim and objectives. Furthermore, it discusses the main research and sub-research questions and methods. Lastly, it contains an overview of all the chapters, delineations, ethical considerations. To restate, the focus of this study is to investigate the impact of IT on decision-making in the organisation. In this study, the researcher investigates the latest literature which relates to this research.

This chapter is subdivided into the following sections: theoretical framework, overview of the theoretical framework, IT investment defined, IT investment decision-making process, strategic planning, IT investment, information technology, internal factors impacting IT investment decisions, external factors impacting IT investment decisions, innovation, information technology investments affecting decisions and information technology investments enabling decision.

Based on this research, the keywords are as follows: IT, ICT, Meat Matrix, integrating the technology acceptance model (TAM) and task fit technology (TTF) model. Additional information sources include Google Scholar, libraries, text books and Emerald as these contained relevant literature. However, it was difficult to find literature linking this topic to the South Africa context.

The importance of this research is to reveal and expose where this organisation stands with respect to IT investment and what impact IT has on communication in the organisation. Specifically, the aim of this study is to focus on how IT investment influences decision-making in the organisation. Likewise, it is also to gain a better understanding of how IT adoption influences the organisation. Moreover, it also investigates the benefits and challenges the organisation faces with investment in IT. Lastly, this study will focus solely on one organisation in the Western Cape as a case study. It is important to observe that this research embarks by studying the existing literature.

The recommended self-adapted theoretical framework in Figure 1 reveals the factors of the IT investment and adoption process in the organisation by applying methodologies, theories, past literature, empirical research and a case study associated to IT investment and adoption in organisations. This research will therefore investigate and indicate the factors influencing internal and external matters when adopting and investing in IT in the organisation.

The study will primarily focus on the internal issues of IT investment in the organisation. The challenges to IT investment and adoption in the organisation will be pointed out indicating and categorising the impact of IT investment and adoption factors.

2.2 Overview of the theoretical framework

The researcher uses as the theoretical framework the strategic IT decision-making process model adapted from Tamm et al. (2012) in Figure 1 as a guide.

The aim of the research is to explore the influences that inform decisions about IT investments in an organisation. The organisational environment serves as the decision context. The decisions are taken by organisational management and each decision has specific characteristics associated with it. Decisions are typically taken using a decision process influenced by external and internal factors that results in the decision outcome. In the case of the proposed study, the CEO, top management and business unit managers were considered participants. The key concepts, depicted in Figure 1, were used as keywords to review the literature. These concepts were also used to inform the interview questions for the data collection.

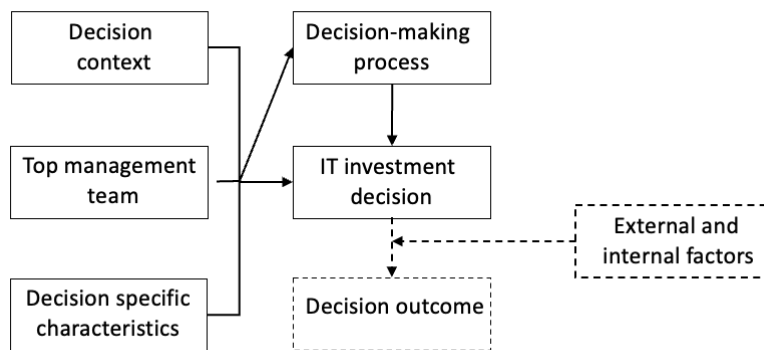


Figure 1: Strategic IT decision-making process model (adapted from Tamm et al., 2014)

2.3 IT Investment defined

There are conflicting findings with regard to investment in IT (Meiryani et al., 2020; Neziraj & Shaqir, 2018). According to Cline et al. (2009), *IT investment* is defined as the inclusion of

computers, office equipment, communications tools, photocopiers and other related technology tools. King and Grover (1991) explain that IT investment refers to all non-human resources dedicated to the processing, storage and communication of information as well as the organisation of those resources. Brynjolfsson and Hitt (2000) include investment in software, training and organisational transformation as part of IT investment.

2.4 IT investment decision-making process

This theme highlights the point that the IT investment decision-making process is within the organisation.

Technology adoption, according to Ghobakhloo et al. (2012:3), encompasses the aim of most adoption studies focusing on influencing factors such as top management, organisational performance and characteristics, organisations, suppliers, customers, government, resources, external IT consultants and vendors.

As claimed by Wang (2006:13), the decision-making process consists of four stages, namely: analysis and planning; evaluation of costs and benefits; selection and implementation; and post-implementation evaluation. For this research, the discussion concerning decision-making for IT investment will focus on the impact of IT investment in the organisation. The next section provides a brief discussion on the strategic planning of IT investment.

Kim et al. (2000) suggest that the IT investment decision process should be flexible and may be influenced by several factors: the identification of the IT requirement set; identifying the degree of flexibility in the requirements; evaluating the importance of the business strategy, critical success factors and flexibility of using a quality function deployment method; establishing the IT investment priority grid; and plotting the evaluation results on an IT investment grid.

2.5 Strategic planning - IT investment

It was important to highlight the strategic planning of IT investment in the literature as it forms part of the research question as stated in Chapter 1. This will assist in discovering how investment in IT affects organisational strategic planning. It is important to plan IT investment and understand what is required to establish the potential value to the IT investment. This requires the alignment of information technology (IT) and the business goals (hereafter referred to as 'alignment').

As stated by Liu and Chen (2004:3), information technology from an organisation's perspective is used to improve the efficiency and effectiveness of an organisation by reducing the bounded rationality of decision-making. They further indicate that when deciding to invest in new IT, the

organisation must take into account at least two values: performance under the current condition and target performance based on future strategies. Liu and Chen (2004:3) define the value of IT investment as an economic and option value. According to Andersen (2001:4), improvement of an organisation's communication tool capabilities will improve the performance through improved strategic decision-making. Chen and Tsou (2007:1) suggest that an organisation makes substantial investments in IT to align organisation strategies, allow innovative functional operations and provide extended organisation networks.

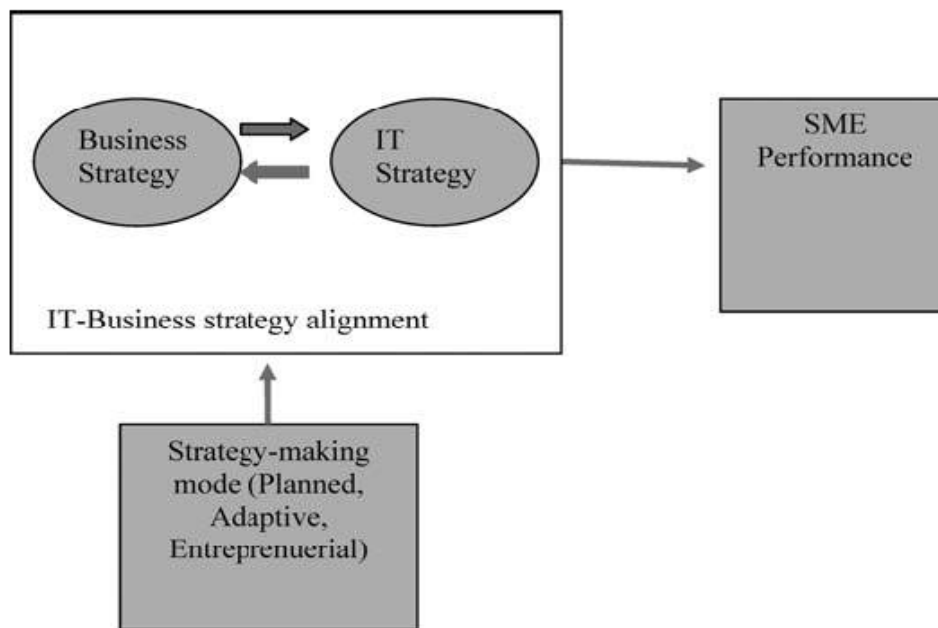


Figure 2: Conceptual model (Kyobe, 2008)

2.5.1 Business strategy

Business strategy may be defined as follows:

According to Kyobe (2008:4) a business strategy may be defined as the plan and objectives which encapsulate decisions and activities of organisations. It also focuses on the application of the resources that a company has at its disposal in such a way that the activities have an added value to the environment so that the firm can succeed in achieving its own goals.

According Gibcus and Kemp (2003:11), some understand business strategy as the allocation of resources or creating a different, specific position. Porter (1980), however, suggests that generic strategies are about cost leadership and differentiation. Kyobe (2008:3) further identifies four strategic orientations: defenders, reactors, prospectors and analysers. There is also an upward trend that when faced with a new set of tests, an entrepreneurial approach to strategy is vital to

success. Another view is that strategy is less about the choice of markets and market positions and more about the building an important internal capabilities (Senge, 1999:4).

2.6 Information technology

According to Kyobe (2008:6) an *IT strategy* can be defined as how an organisation adopts the procurement of IT or develops it, implementing technology for the organisation to achieve its goals. Kyobe (2008:6) further claims that technology scope, systemic competencies and IT governance are components employed to conceptualise an IT strategy, and that systemic competencies include those capabilities or elements that play a role in the establishment of new business strategies or better support of current ones. An example is where IT applications support strategy formulation in the analysis of the environment for threats and opportunities. IT governance looks at IT authority issues, selection and prioritisation of IT projects, allocation of IT resources and tasks (Kyobe, 2008:6).

According to Alkaraan and Northcott (2007:3), strategic investments are significant investments that include high levels of risk, produce outcomes that are difficult to quantify, and have a significant long-term impact on corporate performance. According to Shannak et al. (2010:2), organisations investing in IT such as hardware, software, network and data components do so to improve their performance. Shannak et al. (2010:2) further indicate a linkage between IT spending and organisational performance. Some researchers in the MIS field point to IT business alignment as a construct that can help organisations improve the positive impact of IT on organisational performance. According to Liu and Chen (2004:1), rapid advancement of IT investment impacts management thinking that the risk and payoffs play a role in their decision-making. The following section and subsection provide a brief description of the internal factors that impact IT investment decision.

2.7 Internal factors Impact IT investment decision

The factors which impact IT investment are divided into two groups: internal and external factors. The internal factors are known as strategic factors (Ghobakhloo, 2012). The aim of the study is to determine what impact IT investments have on decision-making in the organisation.

2.7.1 Organisational factors - internal factors

As this research centres around how IT investment impacts the organisation in decision-making, it was important to observe the factors within the organisation.

According to Ghobakhloo (2012:37), the era of new technology is intensified by the investment in areas such as ICT, educational institutions, services industries, information systems and also households. Thus, it is important to note that the result of this technological advancement – the implementation and application of IT – are important driving forces behind many socioeconomic changes. According to Hidayat et al. (2015:3), to determine strengths and weaknesses of internal factors, management needs to analyse and diagnose the factors.

Most organisations are characterised by high business complexity regardless of the size of these organisation, so managing and controlling the organisation's activities is difficult due to the complexity of the information on which they base their decisions. Several organisational internal factors are discussed next.

2.7.1.1 Size of company

It is important to note the size of an organisation to establish how this influences IT investments. Lousã and Gomes (2017:3) find that innovation in organisations is determined by organisational variables, such as the size of a company, its age and the company's sector of activity. In terms of the size of a company, Chandler et al. (2000:4) state that a culture of innovation support relates negatively to the size of the organisation, as determined in their study considering small and midsize industrial companies. In the same context, it was discovered that a sample of Portuguese manufacturing enterprises with a learning culture (Rebelo & Gomes, 2011:3) also have a negative relation to the size of the organisation. When studying the effect of IT investment and size on an organisation's performance, the researchers found that IT investment does influence the organisation's performance, but that size does not (Nurulfajri, 2018).

2.7.1.2 Top management support

According to Lucas et al. (2008), the top management plays a significant role in any organisation. The contribution of the CEO responsible for the organisation's strategies is to take the lead on the organisation's IT investment strategy.

Top management should participate in information requirements and subsequent decision-making processes (Al-Subari et al. 2020:3). Furthermore, they should play a role in the monitoring process, encouraging and motivating employee performance as part of human resource care (Al-Subari et al., 2020:3). Top management should at all times inspire knowledge-sharing and value the importance of effective communication (Al-Subari et al., 2020:3). Al-Shaar et al. (2015:2) mention the important role that top management plays in the creation of innovations and providing

of a conducive environment as part of their decision-making based on organisational knowledge. Top management helps employees to state their requirements for empowerment and offer support for personal development to accomplish achievements as part of self-efficacy development.

2.7.1.3 *Organisational culture*

The importance of organisational culture for IT investment is considered next. Tarabay and Eigbire (2009:11) define *organisational culture* as in possession of "a fairly stable set of taken for granted assumptions, shared beliefs, meanings, and values that form a kind of backdrop for action."

According to Tarabay and Eigbire (2009:11), culture is always a critical concern for organisations right from the origin of organisation, as organisation managers are involved in the daily operations of the business. Tarabay and Eigbire (2009:11) further comment that the culture of an organisation is closely linked to the success it can expect to achieve while planning.

According to Fertig and Joseph (2021), the three real facets which control the functioning of organisations are described by the Planning, Organising, Leading and Controlling (POLC) framework to support effective management. The POLC framework deals with organisational aspects such as planning, organising, leading and controlling. This means that the function of an organisation involves implementing and creating design decisions and claims that the culture of an organisation is closely linked to organisational design. An example is that a culture that empowers employees to make decisions, as this could demonstrate extreme resilience to a centralised organisational design which could hamper the manager's ability to endorse such a design. Culture which supports the organisational structure (and vice versa) can be very powerful. The next section provides a brief discussion on the technological factors

2.7.2 Technological factors

Technological factors, with the constant barrage of new technologies, allow for the achievement of productivity very quickly today, creating new products, creating the need for the product consumption. There is no market which requires the exercise of pressure resulting from technological change, subsequently generating a market. To facilitate the analysis of external environment, specialists in the field are divided (Voiculet, 2010).

It is not always evident how organisations create value through investments in IT (Lombardi et al., 2016). With regard to the governance of IT systems, IT can be used to achieve business

objectives (Lombardi et al., 2016) while also helping to determine the organisation's strategy and success (Ali et al., 2022). The allocation of substantial resources to IT investments can contribute towards an organisation's ability to stay competitive (Turedi & Eerkan-Barlow, 2022). This means that significant allocations from the capital budget should go to IT investments (Xue et al., 2021).

2.7.3 Business factors

This subtheme was included as it forms part of the internal factors. It deals with the extent to which it positions itself between different business units within the organisation.

Considering that a business, as an economic or a commercial activity, has the purpose of generating profit, its existence and achievement depend on suitable adoption to a difficult and over-changing environment (Eruemegbe, 2015:8). Eruemegbe highlights the importance for top management of an organisation to find opportunities and threats in the external environment and for the internal environment to concentrate on potential and existing strengths and weakness.

A study by Turedi and Eerkan-Barlow (2022) found that while top-level management need to drive the business strategies for IT investment, decisions need to be taken to establish whether IT investments are justified when capital may need to be allocated to primary business activities (Xue et al., 2021).

2.7.4 Competitive advantage

For an organisation to be competitive in its environment, it may have to invest in IT. By investing in technology and in the latest business system it gives the organisation an advantage over real-time data, flexibility and access to information creating a competitive advantage for the organisation.

It may still be hard to justify the effect of IT on business performance and competitiveness when considering the impact of IT on performance of the business (Breznik, 2014:2). IT can contribute to direct or indirect impact for sustainability (Breznik, 2014:4). Although Breznik (2014) cautions that other businesses do not always regard IT as a basis for competitive advantage when considering the requirements of competitiveness as a concept. IT can in fact have a negative impact on the performance of the business when considering its competitive advantage.

According to Bhatt and Grove (2005:8), organisations with a positive IT experience allow the organisation to easily integrate its IT and business strategies, thereby creating a reliable and cost-effective system for the organisation to stay ahead of what the organisation requires over the competitors. According to Chukwunonso et al. (2011:3), most contemporary organisations are

making substantial investment in IT to align the organisational strategies, to assume responsibility for extended enterprise networks and to allow innovative functional operations. Chukwunonso et al. (2011:3) further emphasise that an organisation can enhance or enlarge their product and services by implementing IT. For further clarification, Chukwunonso et al. (2011:3) explain that adoption of many innovation activities consists of the addition of new services and also increasing existing services or improving the service delivery process. Chukwunonso et al. (2011:3) state that the success of an organisation depends on how well it implements its service innovation to create new markets; good innovation practices also improve an organisation's competitive advantage.

2.8 External factors Impact IT investment decision

This research study focuses primarily on internal factors; however, emphasis must also be given to the external factors as to when to make decisions to invest in IT. Importantly, external factors impact how new technologies get approved within an organisation.

According to Ghobakhloo et al. (2012:4), external factors are the factors within the environment in which the organisation conducts its business: its competitors, industry and even government. External factors consist of political, economic, social and technology factors. These factors are each considered in terms of how each impacts IT investment decisions within the organisation.

2.8.1 Political factors

When investing in IT, it is important to address the political factors before any technology adoption because political factors, associated with the policies created by the government, have an impact on how an organisation conducts its business. Furthermore, the rule of law may obstruct an organisation in different ways as it conducts its daily business.

According to Makgopa and Daniel (2017:3), a *political environment* can be defined as the legislative and monetary policies of a country in which an organisation operates. Makgopa and Daniel (2017:3) state that the business environment in which an organisation operates is influenced by the regulatory body, for example competition law, labour law and tax law. These laws may present opportunities or threats to organisations. Bialowolski and Weziak-Bialowolska (2014:4) suggest that most investment actions are typically influenced by external decisions which again are associated with government performance and policy.

Ghobakhloo et al. (2012a:19) explain that the available literature and research makes evident that there is a significant positive relationship which could be established between IT adoption and government support. They also claim that due to the lack of resources and organisational size,

some organisations depend more heavily on external resources and support than other companies.

2.8.2 Economic factors

Economic factors refer to an organisation's economic environment which may impact the organisation when investing in IT in terms of the link between benefits and the cost and budget of an organisation.

According Makgopa and Daniel (2017:3), the economic environment consists of external variables such as monetary policies, fiscal, exchange rate, interest rate, inflation rate and level of economic growth. According to Eruemegbe (2015:8), the economic factors which influence many organisations include inflation, interest rates and unemployment. He further comments that to be able to cover such money, organisations will need to increase the price of their products. This will, however, lead to a decrease of the demand for the product, as customers may be unwilling to pay more for the product.

2.8.3 Social factors

According to Makgopa and Daniel (2017:4), the social environment consist of beliefs, values, attitudes and opinions, including the values and lifestyles of stakeholders outside the organisation. They clarify that for the marketer to analyse the social environment, factors associated with the demographic and culture forces must be considered to determine the impact these factors may have on an organisation's marketing strategy. According to Eruemegbe (2015:9), the social dimension include demographic characteristics of the society in which the organisation functions, focusing on customers' moral values and societal rules. He further comments that the process of ethics plays an important role in determining the services, products and level of conduct that the society is likely to get; for example, the relationships between customers, workers and management. He also indicates that the attitude of people relating to their work habits varies, as does the ability to access the level of authority and willingness to accept challenges and risks.

2.8.4 External technology factors

Technological factors as the subtheme of external factors are associates to the continuous level of technological advancement. With the ongoing upgrading of new technology, it is vitally important for organisations to invest in and adapt to new technology. Thus, the use of new technology is essential; most importantly, it benefits an organisation with a competitive advantage (Turedi & Eerkan-Barlow, 2022), increased productivity and lastly, improved business process in the organisation (Ali et al., 2022).

According to Makgopa and Daniel (2017:4), the changes in a new technological environment may pose threats to the organisation as the investment in new technology may significantly increase the capital cost of the organisation. They further mention that any changes in the new technology environment may present opportunities to organisations. As stated by Ghobakhloo et al. (2012:51), with the investment and adoption of IT, as organisation must consider the compatibility and availability of the product in the organisation. *IT compatibility* can be defined as the extent (or ease) with which more advanced IT is combined with the existing technological values, culture, infrastructure and preferred work practices of an organisation. They further emphasise that the cost implication of the new IT/IS adoption is yet another factor which could potentially affect adoption. It is therefore important for managers in an organisation to consider IT costs (hardware and software) closely during an IT adoption process when an organisation is deciding on investing in new technologies.

2.9 Innovation

IT has the potential to drive innovation that can lead to business success. Innovation in business today has the same impact that steam had on the Industrial Revolution. In fact, it is hard to imagine any business that has not benefited from the current digital revolution.

According to Kogabayev and Maziliauskas (2017:5), innovation is the creation of a new idea that could result in new products, processes or services. Such innovations can influence the growth of the national economy in a positive way by increasing employment and profit. They contend that innovation is never a one-time occurrence, but a long process of lengthy organisational decision-making that ranges from the initial phase to a generation of new ideas to its final phase implementation or until a new idea is established based on customer requirements. In addition, during the implementation phase, new ideas are developed and commercialised into new profitable products that reduces cost and increases productivity.

Technological innovation can be defined as the knowledge of components and the link between components, process, methods and skills needed for a new technology-enabled products or services (Kogabayev & Maziliauskas, 2017:5). According to Kogabayev and Maziliauskas, the innovation of products generally responds to market needs.

The Technology Innovation Agency (TIA) was established in terms of the TIA Act (Act No. 26 of 2008) to motivate and increase technological innovation to stimulate economic growth and to improve the quality of the lives of all South Africans.

Innovation has the potential to create an advantage within an organisation when adopting new technologies. It is important to consider how users adopt new technologies to decide themselves whether it is an advantage or not.

2.9.1 Technology adoption

Adopting new technologies may give an advantage to any organisation to offer what other organisations cannot offer. Moreover, it could increase revenue, and furthermore it creates value to customers. Lastly, technology adoption provides opportunities to operate in new environments and creates more investment. It is important to include this in the literature for this research. Larger organisations show higher levels of adoption across all technologies as indicated in a global study by Fudurich et al. (2021). Organisations in the service sector showed higher adoption of technologies. Technologies allow organisations to charge higher prices based on the digital value added to the products. Fudurich et al. further found that there may be a slight negative impact on employment where automation is not yet fully implemented.

According to Johnston et al. (2008:1043), the adoption of new technologies, specifically in the Western Cape, included a wide range of technologies, with 88% using networks, and 70% using some form of customer relationship management software. They further comment that the individual-to-computer ration is calculated at 78% of organisations in the Western Cape having a 1:1 (person: computer) ratio. They also analysed the spending on technologies relating to the three technology sectors – services, hardware and software – and determined that most organisations indicated no change in their spending behaviours. It was, however, further stated that there was a 30% increase in both hardware and software spending. They conclude that most organisations aim to adopt more technology in the future since most organisations derive significant value from using technology within the organisation.

According to Ghobakhloo et al. (2012:3), IT covers a wide range of information processing and computer applications in organisations that include Information System (IS); Information and Communication Technology (ICT); the Internet; and also infrastructure that includes computer hardware and software. This encompasses all technologies which process or transmit information to improve the effectiveness of persons and organisations. They further comment that most studies have focused on influencing factors such as top management, organisational performance, suppliers, customers, government, resources and external IT consultants and vendors. Chen and Tsou (2007:1) believe that an organisation must make substantial investments in IT to align organisational strategies, allow innovative functional operations and provide extended organisation networks.

Organisational performance is a major concern in today's business environment (Shanmugam, 2016:3), as organisational performance is linked with business output and the growth of the business. Shanmugam (2016:3) identifies other contributing factors to organisational performances, such as an organisation's resource planning, ownership structure and board composition and lastly, the type of innovation. He further mentions that other than these issues, information technology (IT) is a dominant factor in the performance of smaller organisations due to the advancement and adoption of IT to help smaller organisations enhance their competitiveness.

At the same time as more organisations begin to adopt IT more widely, there is another important aspect of IT governance that must be in place to ensure that IT capability of smaller organisations can be translated into an improved performance for them (Shanmugam, 2016:3).

2.9.2 Introduction to technology acceptance model

A number of theories have been proposed to explain how users, consumers and organisations adopt to the acceptance of new technologies. It is important to observe and understand technology users and to define their attitude and opinions in adopting technologies. Two of these models are discussed next: the technology acceptance model (TAM) and task technology fit model (TTF).

TAM is a model that supports the way IT investment can be managed. Most importantly, it points out how technology users identify the adopted technology within the organisation. According to Parvari et al. (2015:146), the use of IT is important in today's organisations to determine the impact of IT on an organisation's performance in almost every area of operation, including cycle time, inventories, manufacturing and customer support in marketing and distribution. Parvari et al. (2015:146) express that IS/IT adoption has many advantages and disadvantages should it not be accepted by users since IT/IS has an undeniable impact on organisational performance. They further emphasise that IT/IS increases value to an organisation in its performance and activities that contributes to its competitiveness in today's globalised world.

Wu and Cheng (2017:221) propose a unified model integrating the technology acceptance model (TAM). The task fit technology (TTF) model also determines how users accept the current technology in an organisation.

2.9.3 Technology acceptance model (TAM)

The TAM model is employed to determine the two factors that contribute to the behaviour of IT adoption: effectiveness and ease of use (Parvari et al., 2015:147). The ease of using a system

with specific IT applications could increase the user's job performance. The relationship between beliefs, attitudes and behaviour refer to the attitude of users to measure user adoption of IT (Parvari et al., 2015:147).

The intention is to consider the users' acceptance behaviours across contextual settings and technologies. According to Lai (2017:6), the TAM model was first used to determine the behaviour of using a computer; to explain the general determinants of acceptance of computer technology; and to determine users' behaviour and attitudes towards computer technology.

The TAM model tests two principles: perceived usefulness (PU) and perceived ease of use (PEU). PU refers to the possible users who are using a certain system (e.g., single platform or scanning payment system) which can improve the users' actions; while PEU refers to how effortlessly the operator uses the technology (Lai, 2017).

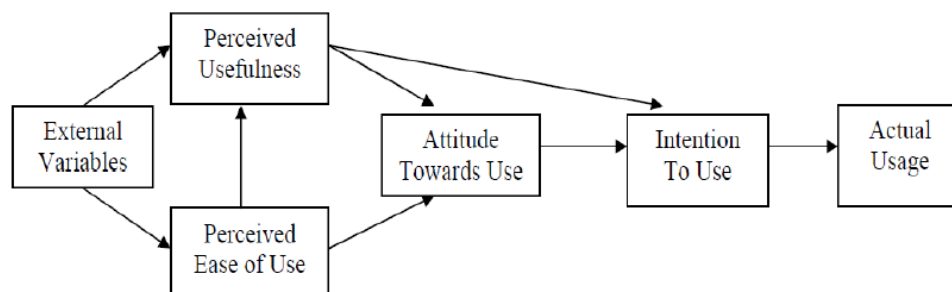


Figure 3: First modified version of technology acceptance model (TAM) (Lai, 2017)

The task-technology fit (TTF) model highlights a single impact that refers to improved efficiency, effectiveness or higher quality (Lai, 2017:3). Lai contends that a good fit between task and technology increases the likelihood of utilising the technology. This should also increase the performance impact since the technology meets the task needs and wants of user. The model (see Figure 4) is used to study the actual usage of the technology, specifically the testing of new technology to get feedback. The task-technology fit model is good for measuring the technology applications already released for use in the technology environment.

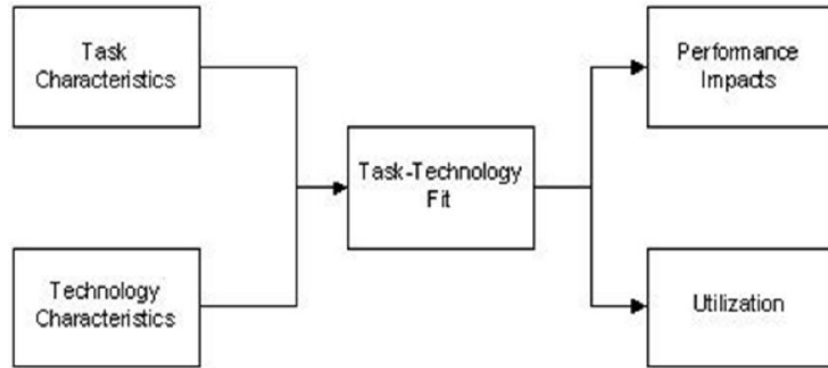


Figure 4: Task-technology fit (TTF) (Lai, 2017:4)

According to Wu and Chen (2017:223), the TTF model is widely used as a theoretical model and for evaluating how information technology leads to performance; evaluating usage impacts; and judging the match between task and technology characteristics. They further indicate that both task characteristics and technology characteristics can affect the task-technology fit although this may be able to determine user performance and utilisation of technology.

2.10 Information technology investments affect decisions

For the purpose of this study, it was necessary understand how investment in IT affects the decisions in an organisation. This section and corresponding subsections focus primarily on the benefits and challenges of how IT investment affects decisions. These subsections clarify how IT investment may benefit an organisation and improve productivity, performance and flexibility in the given production environment. It describes the ways in which technology has encouraged many organisations to remain flexible, adapting their operations to newer and better technological advances. Furthermore, it points out different tech-tools in the organisations which bring benefits.

2.10.1 IT performance

Organisations invest significantly in IT such as hardware, software, network and data components to advance their performance (Shannak et al., 2010:1356). According to Pfano and Beharry (2016:376), to having a performance advantage such as modern office technologies can also improve the productivity of managers, because technologies can enable mobile work as managers can begin to use office technology tools in ways to enhance their performance.

Similarly, Pfano and Beharry, (2016:377) explain the idea of an on-demand integration of IT and business to make the organisation more nimble, responsible and profitable. They further comment that the most important aspects that can be considered by an enterprise are flexibility and the

impact of integration on the effectiveness and efficiency of IT investment. The relationship between information technology (IT) investment and firm productivity and performance has been an important topic in management of information systems research for years (Sheng & Mykytyn, 2002:136).

Every organisation must fully focus on efficiency and effectiveness, irrespective of the kind of IT systems it uses, because IT can contribute significantly to the organisation's productivity and performance (Sheng & Mykytyn, 2002:136).

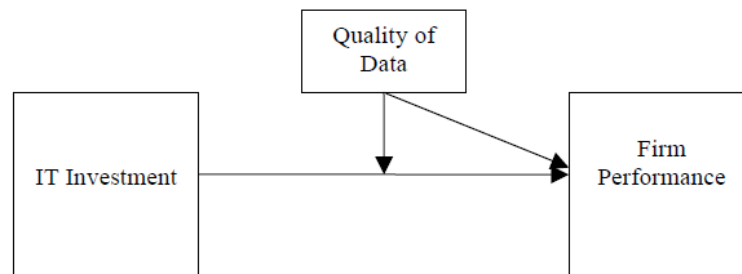


Figure 5: Relationship between IT investment and organisation performance (Sheng & Mykytyn, 2002)

2.10.2 Organisational data

More and more organisations recognise that data is a key organisational resource; organisational data plays an important role when strategic decisions are taken in an organisation. In fact, data analytics may impact on the financial performance of organisations as more organisations are considering digital transformation (Gul & Ellahi, 2021; Perdana et al., 2022). In their study, Perdana et al. (2022) assessed data analytics business value based on the enablers of information and system quality and inhibitors of lack of understanding, lack of infrastructures and skills, and concerns over data security and privacy, to determine organisational performance and the role of data analytics for its purpose of use. Their intention was to establish whether data analytics could bring value and improve the performance of an organisation.

More organisations recognise that data is a key organisational resource used in strategic information systems, such as executive (ES) or decision support (DSS) systems (Sheng & Mykytyn, 2002:136). The quality of data influences the quality of the services, products, operations and organisational decisions. Managers find themselves having to make quick and high-quality business decisions every day, so if managers are unable or unwilling to make quick decisions, organisational performance could be compromised (Sheng & Mykytyn, 2002:136).

Big data, data mining, data visualisation and business analytics are tools used to the benefit of an organisation when integrating data from different internal and external sources to diagnose and improve organisational performance (Sharma et al., 2014). Sharma et al. argue that deriving insights from data then creates value from the insights, but the pathways from investment to economic value are not obvious. According to De Luca et al. (2021), in today's organisational environment, computers manage large volumes of data resulting in many decisions which occur behind the scenes. This helps us even when we do not realise, such as in detecting credit card fraud. Rezaei et al. (2014:1210) indicate the importance of an information production culture to support their organisational operations with information-oriented thinking. Rezaei et al. (2014:1210) also point out that most databases are created on the idea of IT function by streamlining difficult informational processes within the organisation to create an organisational network and connect organisations together.

According to Lazarević and Lukić (2016:371), the storage of data and the use of analytical software assist human resource managers in monitoring human resource systems and keeping data accurate and updated.

2.10.3 Productivity

Productivity was investigated in the review the literature to assess how information technology investments affect decisions about productivity.

Many definitions have been proposed in relation to productivity; for example, labour productivity measured by output per employee or per hours worked over a given period (Baily et al., 2020).

Rezaei et al. (2014:1212) suggest that factors such as motivation, creativity, innovation and competitiveness influence productivity, along with cost reduction, improvement of the quality of activities, work time reduction, job satisfaction and human resources. They explain that IT has impacted all aspects of the organisation's business environment and therefore also productivity.

Ghorbanzad and Beig (2012:1195) suggest that because IT evolves so fast there are strong interactions amongst various aspects of the organisation and IT which impact productivity.

2.10.4 Challenges affecting investment decisions

This theme considers how IT investments affect decision-making in an organisation.

Al Shaar et al. (2015:501) explain that an organisation can decentralise decision-making by using an information technology application to allow managers from all levels in the organisation to

make effective decisions throughout the organisation. They further contend that managers can use their authority to delegate to other staff by applying an appropriate technology.

Akanda and Van Belle (2013) point out the close link between adoptions of ICT skills and IT investment. They further mention that ICT practices, ICT knowledge and ICT skills are important for the success of the organisation, whether a business would adopt or reject the IT.

The other problem an organisation may face concerns security issues. Akanda and Van Belle (2013) suggest that to curb security issues, certain measures need to be applied such as a password with possible data encryption. It is also important to ensure confidentiality of data which is shared across the networks or platforms of the organisation. Data integrity means that only authorised individuals in the organisation may make changes to data.

Bayo (2019:105) emphasises that training plays an important role in any organisation regardless of the level of technology available. With the adoption of new technologies, adequate training is required. Training can lead to effective technology implementation and overall organisational success.

Without an existing IT infrastructure within an organisation, it is difficult for the business to plan the implementation or integration of new technology (Bayo, 2019:105). According to Bayo, the implementation of new technology becomes difficult or problematic when a business decides to upgrade or implement new technology with existing technology in the organisation, especially when there is a substantial investment in existing technology. In addition, sometimes old data cannot be transferred because of incompatibility reasons. Often existing systems are linked to current standardisation, not compatible to new standards, and this problem is aggravated when adapting to continuous ongoing technology changes.

Sometimes organisations have to hire external consultants when they do not have specialised expertise and skills to support specialised software, applications or technologies (Ghobakhloo et al., 2011:67). This is certainly the case with advanced technology as it requires the engagement of consultants to support specialised technology applications. This is often not possible with small businesses. Qualified business analysts, software analysts and programmers are expensive to employ.

2.11 Information technology investments enable decision-making

This section and subsection focus on all aspects of IT investment to understand how investment in IT affects decision in relation to IT, performance, productivity and data. Specifically, it discusses how IT is involved in decisions in the organisation.

According to Pfano and Beharry (2016:378), technology is about the application of tools, methods and techniques to improve production and processes. Rezaei et al. (2014:1210) state that all forms of IT equipment which perform the processing, storage and transmission of information that can be used in an electronic format are considered. IT automates simple, tedious tasks such as word processing and advanced processes such as production, scheduling and logistics; in this way, IT enables organisations to operate efficiently and profitably (Nikoloski, 2014:303). IT also includes the management information systems (MIS) – computers, hardware, software and networks – used to automate and support organisational tasks and decision-making.

Many organisations have used software, different types of advanced applications, computers and the Internet to transform their organisation from local places of business to national and global market competitors (Nikoloski, 2014:303). Nikoloski also emphasises that in many ways, technology has also forced many organisations to remain flexible, adapting their operations to newer and better technological advances. Thus, by using these technology tools, organisations and employees enjoy a number of business-related benefits.

2.11.1 Hardware and information systems

In this subsection, the correlation between software and hardware is assessed to determine how information technology investments enable decisions.

According to Piñeros and Gómez (2017:28), managerial decisions are some of the most recognised issues in management science. From this perspective, it is fundamentally important that managers understand how to take advantage of IT in particular when decisions are taken related to the renewal of products and services and with the quest and selection of suppliers. They further comment that managers search and capture information through IT. This helps managers understand the behaviour of consumers and the solutions available in market information about products and services that they need to satisfy their organisational needs.

As stated by Pfano et al. (2016:379), mobile technology has changed the way we operate in terms of continuous interactions between employees, customers and managers. Mobile technologies like Smartphones and other tools like tablets allow people to contact each other through social media, for example, LinkedIn, Twitter, Skype and Facebook.

Tripathi (2011:112) states that a decision support system (DSS) is a computer-based information system to help managers in the organisation select one of the many alternative solutions to a problem based on the organisational data. Some functionality of the DSS is that it handles large

amounts of data and performs complex, sophisticated analyses and comparisons using advanced software packages.

The integration of e-business into business processes have changed the way an organisation functions with the incorporation of IT into organisational activities so that organisational transactions can be performed online with data driven by corporate databases. According to Beheshti and Salehi-Sangari (2007:235), e-business integration with back-office operations can benefit inventory management, sales processing, order entry and catalogue development. Salesperson-centric technologies are intended primarily for the salesperson; these technologies are designed to facilitate sales transactions (Ahearne & Rapp, 2010). When using web portals, employees can independently update their data and manage their benefits package (Lazarević & Lukić, 016:371). With mobile web and wireless access to the Internet, employees can access the organisation's human resource activities.

According to Shannak et al. (2010:1356), most organisations invested significantly in technology such as data components, software, network architecture and hardware, to improve the organisation's performance. Shannak et al. (2010:1356) further indicate a strong link between IT spending and organisational performance.

2.12 Chapter summary

As discussed in the introduction, the researcher gives a brief synopsis of what the chapter and research intended to achieve. Furthermore, the researcher uses Figure 1 as guide to construct the theoretical framework to convey to the reader the thinking process of the researcher. This figure provides the reader with a clear picture of the impact IT investment has on decision-making in an organisation. This chapter further discusses the IT investment decision-making process and business strategy and highlights the value of information technology investment to an organisation. Moreover, the researcher gives a brief description of how internal and the external factors impact IT investment decisions. For the purpose of this study, this chapter briefly discusses how technology adoption impacts decision-making within an organisation. This chapter also explains the technology acceptance model (TAM). Most importantly, it points out how technology users identify an adopted technology within the organisation. As revealed in the literature, the researcher gives a brief description of the internal and external factors impacting IT investment decisions. This chapter further points out how investment in IT affects the decisions in an organisation. Moreover, the literature also reveals the benefits and challenges of how IT investment affects decisions. It also describes how IT improves productivity, performance and flexibility in the given production environment. Additionally, this chapter briefly reveals the

importance of the real-time data. Lastly, the chapter explores the correlation between software and hardware.

In the upcoming chapter, research methodology will be discussed including the following: purpose of research, research design, research philosophy, research approach, methodological choice, research strategy, case study, data collection, relation between interview questions and research questions, population and sampling size, purpose sampling, data analysis, reliability of data, validity of data, ethical considerations, participants, data management and delineation.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

In this section, the methodological framework for this study is described, including key issues such as the method employed to focus on the research objectives.

The study aim is achieved through the research design that guides the data collection and analysis to investigate a selected organisation in the Western Cape Province of South Africa.

3.2 Purpose of research

Research classifications are based on the purpose of the research; it could be exploratory, descriptive or explanatory (Saunders et al., 2019). Each study is different as it generates new outcomes with different lenses. It is important to analyse the most suitable knowledge to use in a research study because the choice and adoption of a method for research is directed by the need to generate certain knowledge (Saunders et al. 2019).

As stated by Saunders et al. (2019), an exploratory study consists of finding out what is happening, to search for new insights. This study explores how an organisation perceives its IT investment.

3.3 Research design

According to Saunders et al. (2019), research design, a general plan to answer the research questions, provides the researcher with clear objectives derived from the research questions.

The role of research design is that it provides a connection between the theories and arguments that notify the research and the empirical data collected (Zefeiti & Mohamad, 2015). A research design can be defined as a plan with details about the tasks to be performed, in order to test a specific hypothesis or answer a research question under a given condition (Bless, Higson-Smith & Kagee, 2006; Chigwendere, 2018). It also suggests how the participants of a proposed study are selected and how data are collected.

For this research, the researcher has adhere to the research process as presented in Figure 7 as an onion. Saunders et al. (2019) clarify the diagram that shows the several layers and methods available to be employed when doing the actual research. Figure 3.1 illustrates the contents of the onion layers. The following subdivisions explain the inside of the onion: philosophies, approaches, strategies, choice, time horizons, techniques and procedures.

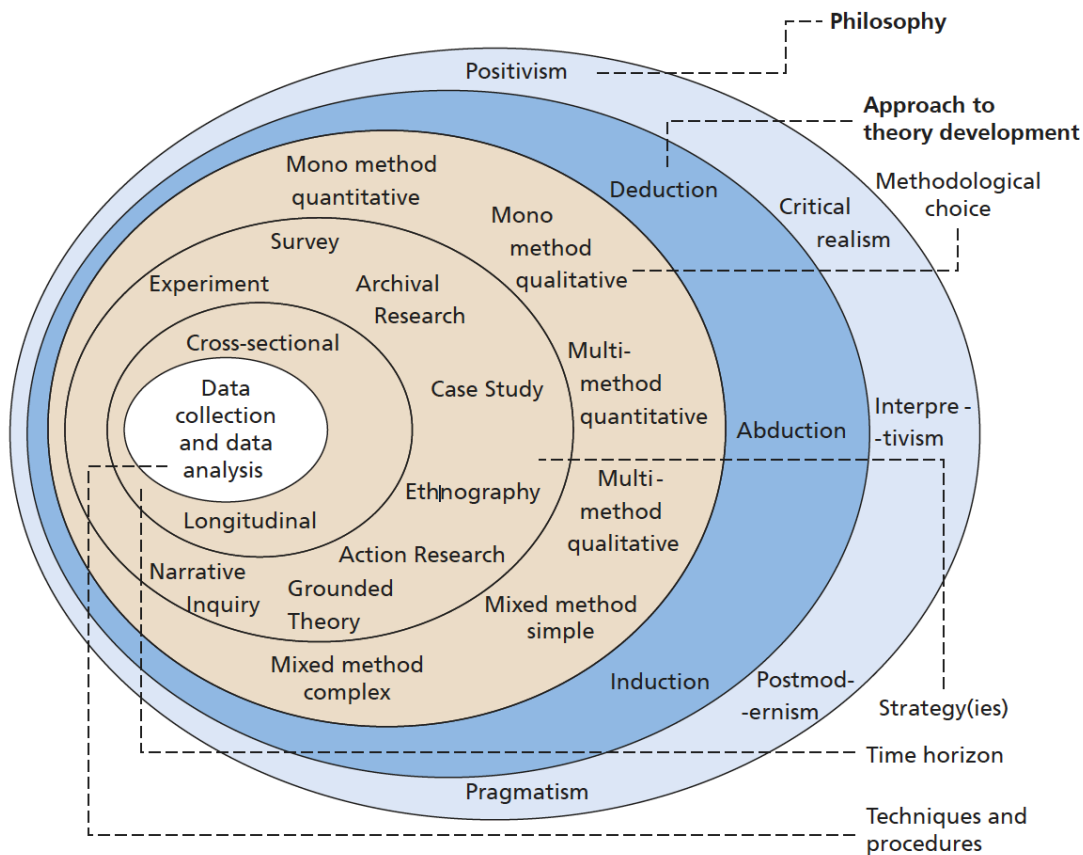


Figure 6: Research onion (Saunders et al. 2019)

3.4 Research philosophy

As indicated in Figure 3.1 the research philosophy is the first layer of the onion and the most important to position the research. It assumes the position of the researcher in terms of world view and knowledge creation. Typical research philosophies include positivism, realism, interpretivist and pragmatism in relation to epistemology ontology and axiology.

3.4.1 Paradigm

Chigwendere (2018) acknowledges a paradigm as playing a fundamental role in science. According to Scotland (2012), a *paradigm* consists of the following components: methodology, epistemology, ontology and axiology. Kuhn's definition of a paradigm is of joined clusters of basic concepts, variables and problems attached with corresponding methodological approaches and tools. This refers to a research study of culture with a specific focus on a set of beliefs, values, and assumptions that a community of researchers has in common regarding the nature and conduct of research (Kuhn, 1977).

According to Chigwendere (2018), an interpretive paradigm is used to understand people in their natural environment. An interpretivist thus concentrates on exploring the complexity of social phenomena aiming to achieve understanding and interpreting everyday activities (events) and social structures as well as the values of people attach to these occurrences. Based on an interpretivist philosophy, the situation in each business is unique and varies from other situations. Al-Ababneh (2020) emphasises that this approach is not suitable for generalisation due to the continuous state of business organisations and various interpretations by people as well as the complexity and uniqueness of the world (Saunders et al., 2019). An interpretative paradigm was adopted for the organisation under investigation in this study to understand the organisation's views on IT investment.

3.4.2 Ontology

According to Saunders et al. (1997), *ontology* refers to assumptions about the nature of reality. The ontological assumptions guide the way we see and study research objectives as in this research, we have investigated the views of IT investment in an organisation (Saunders et al., 2019). The objectives in a normal business and management structure included organisations, management, individuals' working lives and organisational events and artefacts.

3.4.3 Epistemology

According to Saunders et al. (2019) *epistemology* concerns the assumptions about knowledge where knowledge constitutes standard legitimate and valid knowledge and how we can communicate knowledge with others. Crotty (1998) explains that epistemology involves knowledge and exemplifies a certain understanding of what is involved in knowing and *what* we know and *how* we know. He explains that epistemology aims to provide a philosophical basis for what kind of knowledge will be possible and how to ensure that knowledge is both legitimate and adequate.

3.5 Research approach

As shown in Figure 3, the research approach is the second layer of Saunders et al.'s research onion. According to Figure 3, the research approach is divided into deductive and inductive approaches. According to Saunders et al. (2019), the deductive approach is used to test theory, which is also known as part of the development process of the theory. It concerns where the existing theory has been tested against collected empirical data to determine if they correlate to each other. Saunders et al. (2019) suggest that in a deductive approach, researchers identify a specific theory in reality that needs to be investigated, and from this, a theoretical foundation can

be formed to formulate a hypothesis to determine its credibility. With the formulated hypothesis, the empirical data is first collected and then tested against the proposed hypothesis to determine if it was validated in reality or not. On the other hand, Saunders et al. (2019) report that an inductive approach can be described as the opposite of deductive approach, meaning that it will follow the opposite cycle.

3.5.1 Qualitative and Quantitative Data

Saunders et al. (2019) indicate the difference between qualitative and quantitative data as in the table below.

Table 1: Difference between qualitative and quantitative data (Saunders et al., 2019)

Qualitative data	Quantitative data
Based on meanings expressed through words	Based on meanings derived from numbers
Collection results in non-standardised data requiring classification into categories	Collection results in numerical and standardised data analysis conducted through the use of diagram and statistics
Analysis conducted through the use of conceptualisation	Analysis conducted through the use of diagram and statistics

3.6 Methodological choice

A mixed-method approach is when the researcher aims to analyse and collect qualitative and quantitative data in the same research study (Shorten & Smith, 2017). In such a study, a purposeful mixing of methods for data collection will achieve a good understanding of contradictions and connections between quantitative and qualitative data, thereby providing the research participants with opportunities to share their experiences across the research procedure (Giddings & Grant, 2006). Giddings and Grant (2006) point out that to understand the differences between methodology and methods, the terms quantitative and qualitative are considered. However, this study uses semi-structured interview questions as a single method to collect data from different participants.

3.6.1 Research strategy

As indicated in Figure 3.1, research strategy and time horizons are the third and the fourth layers of the research onion (Saunders et al., 2019). The researcher now considers whether the present study should be described as descriptive, casual or exploratory.

3.6.2 Case study

As stated by Rosenberg et al. (2007), a *case study* can be defined as a strategy for performing research that involves an empirical study of a particular situation within a real-life environment using multiple sources of evidence (Saunders et al., 2019). In this study, it is important to determine the views an IT investment will have on decisions taken by the senior management on the IT adoption in a specific organisation; therefore, the strategy for this study is a single case.

3.6.3 Using a case study approach

According to Rosenberg and Yates (2007), a case study design should be considered when the study wants to answer *how* and *why* questions (Baxter & Jack et al., 2015). They further state that one cannot influence the behaviour of those parts of the study. In this study, we have focused on performance and productivity. Also, the researcher has probed into contextual conditions to establish how these influences the study. In a case study research, boundaries are not clear.

A case study was chosen because the case concerned the view of IT investment on decision-making in a specific organisation.

3.7 Data collection

According to Saunders et al. (2019), literature is available to help the researcher to develop good understanding and insight into the status of the research topic. Previous research forms the literature representing the scientific body of knowledge. Saunders, Lewis and Thornhill (2009:68) explain that reviewing the literature will establish the foundation upon which the research is built. The contribution of literature is important to research in an effort to collect relevant and accurate data.

3.7.1 Research interviews

There are three ways of conducting an interview: over the phone, using a virtual platform or face-to-face where answers to the posed questions are later converted into text (Alsaawi et al., 2014).

In this research, interviewing was be the key method for data collection to obtain the views of the research participants about IT investment supporting decision-making in their organisation. Saunders et al. (2019) consider the real-life situation to determine what sort of interview will be conducted for the research, whether questions should be structured, semi-structured or unstructured.

3.7.1.1 *Structured interviews*

According to Saunders et al. (2019), an interview is a controlled way to obtain information from interviewees. It is pre-planned, where the researcher writes down the interview questions prior to conducting the interview and each interview will be based on a standardised or identical set of questions. Structured interviews are typically used to collect quantitative data.

3.7.1.2 *Semi-structured interviews*

According to Alsaawi (2014), semi-structured interviews are a familiar type of interview often used by social science researchers, wherein interview questions are pre-planned and designed prior to the interview but where the interviewer can give the interviewee an opportunity to elaborate and explain particular issues in response to open-ended questions (Saunders et al., 2019). Semi-structured interviews are piloted in a way which is pre-planned by the researcher who will have a list of questions and themes to be covered and then test these with one or more people to establish if the questions are well formulated and clear. Semi-structured interviews are primarily used to collect qualitative data.

occasionally researchers are not in favour of the use of structured format which may limit the depth and richness of responses (Alsaawi, 2014). In this study, the researcher relied on semi-structured interview questions to collect data from selected participants.

3.7.1.3 *Unstructured interviews*

Unlike the semi-structured interview, an unstructured interview has no predetermined list of questions to work through during the interview (Saunders et al., 2019).

An unstructured interview is the opposite of a structured interview, in that the flexibility of this type of interview is wide open. This allows the interviewee the freedom to elaborate or deviate, with the risk that this could render unpredictable results. Likewise, this could lead to large amounts of data that are not easy to analyse. Unstructured interviews are generally regarded similar to a conversation, where an interviewer asks a single question which gives the interviewee an option with regard to the extent of response (Bryman, 2008). The interviewer will minimise the interruptions to the interviewee (Alsaawi, 2014). This type of interview creates a relaxed environment, which is suitable for ethnographic research.

3.7.2 **Population and sampling size**

According to Saunders et al. (2019), a full set of cases from which a sample is taken is called the *population*. A population is the aggregate or totality of all the objects, subjects or members that fit

in to a set of conditions (Saunders, 2012). According to Ragab and Arisha (2018), *sampling* refers to studying a small group of “cases” which represent a larger population. Sampling is a process of selecting a statistical sample of individuals from a population on which the researcher is focussing (Majid, 2018). Majd further explains that sampling is a key tool in a research study since the population of interest usually consists of too many individuals for any research project to include all as participants.

In this study, the population was from one organisation from all the business units. The study selected 15 participants whose work requires them to use different types of technology in the course of their work as part of taking decisions.

3.7.3 Purposive sampling

According to Robinson (2014), a sample size used in research is influenced by practical and theoretical considerations; in most studies, a provisional decision needs to be taken in the initial stage of the research regarding the sample size for the research (Robinson, 2014). Purposive sampling is a non-random technique to deliberately select the participants for a study based on their ability to provide the data needed for the study (Etikan et al., 2016).

In this study, a semi-structured interview data collection method was selected. Interviews were conducted with the 12 participants who agreed to participate from the originally selected 15, all of whom represent the different business units within the organisation.

3.8 Relation between interview questions and research questions

The interview questions are an important component, so there is clear connection between the interview questions and the research question. Thus, the aim is to collect the relevant data required to formulate the research conclusion.

As from Chapter 1, the research question was derived from the problem of discussion and based on this, the interview questions were formulated. Firstly, as indicated in Chapter 1, the primary research question required the discovery of the impact of IT investment on decision-making. So some of the interview questions focused directly on the impact of IT investment on decisions. The secondary research question is based on how investment in IT affects decisions and also how IT investment enables decision-making in the organisation.

Sub-research question 1 (SRQ1): How do IT investments influence the organisation?

Interview questions:

1. How is IT used to take decisions?

2. How does the IT investment benefit the organisation?
3. How does the IT investment influence decisions in the organisation?
4. Please provide an example of how the IT investment benefits a decision in the organisation – what was the outcome?
5. What challenges are experienced with the IT investment in the organisation?
6. How do the challenges of the IT investment influence the decisions?
7. Please provide an example of a challenge with the IT investment that influences a decision – what was the outcome?

Sub-research question 2 (SRQ): What IT investments enable decision-making in an organisation?

Interview questions:

8. What would be, in your opinion, a good IT investment for decision-making in the organisation?
9. What are the IT investments in the organisation?
10. How was the IT invested in the organisation?
11. Who decides what IT to invest in?
12. What decisions are taken in the organisation?
13. Who takes decisions?
14. How are decisions taken?
15. What is the experience of the decision-makers in using the IT investment in the organisation?

The researcher designed the interview questions in such a way to make it easy for interviewees to answer interview questions relating to the research questions.

3.9 Data analysis

Ashirwadam (2014:1) explains that *data analysis* is a short method of compiling figures and facts to solve research problems with the intention of findings answers to the specific research questions under investigation. The second part is the interpretation of the data which is important to the research.

Thematic analysis was be used for the qualitative data collected with the semi-structured interviews. This method is a searching process to identify and report repeated patterns by coding the data (Kiger & Varpio, 2020). In this study, the key concepts identified from the literature were used as codes to identify the different quotations from the data.

As discussed, concerning the method of data collection in the previous subheading, the impact of IT investment influences organisational decisions.

Software was used to analyse and compared the results of various concepts used in the research questionnaires. Excel was used to code the data and to present the data in diagrams.

The unit of analysis for this study was the organisation with the unit of observation the decision-makers of the organisation.

3.10 Ethical considerations

In this section, ethical considerations that play a key role in any research study are described.

Daniel (2016) explains that research integrity depends on how the researcher approaches and designs the research. Research integrity is about the ethics and codes of conduct that direct the researcher's interactions with the participants and secondly, the professional rules to be followed (Denzin & Lincoln, 2005:96). The proposed study applied for ethics approval through the appropriate faculty processes, after which the faculty's ethics committee granted ethical clearance. The following were addressed in the ethics application for the research participants: autonomy to show respect to participants; that participants benefit from participation; that no harm would befall the participants through their participation; that research objectives were made clear; that participation was voluntarily; and that responses anonymised (Simons, 2009).

3.11 Chapter summary

This chapter focuses on the research methodology wherein a research design outlines a general plan to obtain answers for the research questions. This research study uses both deductive and inductive approaches. As pointed out, the methodological choice for this research is a mixed-methods approach to data collection. This is done in order to achieve a good connection between

quantitative and qualitative data. Thus, it is also important to note that semi-structured interviews were conducted with the different business units within the organisation. This chapter also discusses the data analysis that was used for the following chapter (Chapter 4). In the following chapter, the researcher discusses in detail the findings and interpretations of the study.

CHAPTER 4: FIELDWORK

4.1 Introduction

This chapter consist of three sections – theory, findings and analysis – as viewed in Figure 4.1. The researcher approached this chapter by initially gathering the findings which are derived from the semi-structured interviews with 12 participants, and secondly by the analysis which is derived from the interpretation of the findings.

4.2 Background and context of the organisation

In 1970, the owners opened the doors of their humble meat business for the first time. They started out as a single butchery. Today, the organisation is a family-owned and a long-established supplier of quality Halal products. Their four branches pride themselves on quality in a unique state-of-the-art shopping environment and continuously strive to improve service excellence and customer satisfaction. From four butchers, the family business has progressed to a professional corporate organisation. Today, the organisation has moved into processing and meat packaging. Processing meat involves slaughtering animals, cutting the meat, inspecting it to ensure that it is safe for consumption, packaging it, processing it into other products such as sausage or lunch meats, delivering it to stores, and selling it to customers. However, the meat processing industry has developed it into the state-of-the-art deli plant wherein a variety of polonies, sausages and other special requirements for customer deli products are manufactured. As the organisation is moving forward, it finds itself in a continuously changing environment. It is important, therefore, that the organisation keep abreast of the latest technology and innovation.

As described in this chapter, the findings from the research are presented in a methodical manner as the next step of the research process. The findings are first presented as an analysis of the qualitative data. It is further pointed that these findings were obtained from 12 individual semi-structured interviews.

4.3 Data collection

4.3.1 Participants

A formal meeting with the group chief executive officer (CEO) and founder was scheduled.

Participants were selected from different business units that have been affected by the impact of IT investment. Participants were selected by the CEO of the organisation. Emails were disseminated to all participants who were selected for the study research. Once the group

executive officer (CEO) gave permission for the decision-makers to participate in the study, the participants were identified and requested to participate.

4.3.2 Interviewee selection

Responses from the 12 selected participants from the different business units were analysed to answer the research questions to meet the research objectives.

Each of these participants was asked the same set of questions in order to garner a holistic view to determine their views on IT investment and the effect IT will have on decision-making.

Table 2: Participants

Participants/level	Category	Participant code
Operation Manager Wholesale	Production and operation management	OMW
Supervisor wholesale	Supervisors and middle management	SW
Stock Control	Supervisor	SC
Senior Production Manager Fresh Meat Plant	Production management and operation management	SPMFMP
Meat Matrix Operator	Operators	MMO
Senior Production Manager Deli	Production management and operation management	SPMD
Cost + Management Accounts +Systems	Business analyst	CMAS
Procurement Manager Fresh Meat Plant	Middle management	PMFMP
Operation Manager Fresh Meat Plant	Operation management	OMFMP
Plant Manager Deli	Middle management	PMD
Financial Manager	Operation management	FMW
Process Manager	Production management	PM

Next, the main business units of the organisation are described.

4.3.2.1 Business analysis

The business analysis participant was selected as this participant plays an integral role in predicting the consequences of disruptions to a business and its process and system by collecting relevant data. This is important for the organisational IT/IS.

4.3.2.2 Production management and operation management

It was decided to include operation management as this is a vital role in the day-to-day operation of the organisation. Operation management are concerned with the management of the organisation's operations and processes.

Operation management performs various functions in the organisation, with one key function to increase production using various IT tools.

4.3.2.3 Supervisors and middle management

An organisation's production environment is where supervisors and middle management perform their activities. Middle managers are chosen as participants for this research as middle managers are accountable to top managers for their departments' functions.

These participants were chosen as they are involved and responsible for all production-related functions. It is clear that IT investment certainly impacts their work environment.

4.3.2.4 Production supervisor

Production supervisors play an important role in monitoring the work flow, implementing cost reduction, developing reporting procedures and systems, providing solutions by analysing data, investigating issues and identifying solutions.

4.3.2.5 Operators

Operators were chosen as part of the participants population to be interviewed. Operators in the meat production environment find themselves working with various technologies: the in-house software, business systems to load new products on the system, the latest technology to separate meat and by-products, monitoring machines and equipment and adjusting if necessary.

4.3.3 Data collection in practice

This section focuses primarily on the method of data collection. For the purpose of this research, semi-structured interviews seemed to provide the best qualitative data. Twelve participants from different business units were selected, as indicated in Table 3.2. The participants for this research were strategically selected based on how IT impacts their current work environment.

The semi-structured interviews were piloted by the researcher with a list of questions that cover the relevant themes. All the interviews with participants were scheduled with phone calls and e-mail. The researcher experienced some constraints getting dedicated resources from the different business units which were beyond the researcher's control. One-on-one interviews were conducted with all participants. The participants were asked to share their opinions concerning

the impact of IT investment on decision-making in their respective business units in the organisation. The flow of the conversation varied depending on the questions.

Each of these participants was asked the same generic questions to solicit a holistic view of the impact of IT investment on decision-making in the organisation.

The findings of this research can support management in identifying the impact IT investment by adopting effective technologies and by understanding the benefits gained by investing in IT.

4.4 Data analysis process

In this section, the process of managing the data after collection is discussed.

4.4.1 Data management

The responses were captured on a spreadsheet with all participant answers on one sheet. From that sheet containing the raw data, the responses for each question were copied to separate sheets, one sheet with all the responses per question. On the individual sheets, names and all other identifying information were removed to ensure that data is anonymised. The spreadsheet was stored in a safe place to satisfy the FAIR principles for sound research data management, i.e., for the data to be findable, accessible, interoperable and reusable.

4.4.2 Data analysis

The responses were then coded by identifying recurring patterns that then emerged as relevant themes. The themes were combined and quantified to derive the findings and then converted into percentages and collated in the form of tables, graphs and figures to make the data presentation meaningful. Data were analysed according to the research questions posed earlier in the study and the key concept associated with each interview question.

4.5 Findings

Next, the findings for each key concept are presented.

4.5.1 IT supported decisions

This interview question was to identify how investment in IT influences decision-making. The coding process is presented in Table 3.

Table 3: Responses with codes and occurrences

Code Analysis		
Participants	Theme: REAL-TIME DATA (RTD)	9
Operation Manager Wholesale (OMW)	Availability of real-time data	RTD-1
Senior Production Manager Deli (SPMD)	Real-time data	RTD-2
Cost + Management Accounts +Systems (CMAS)	Real-time data available from MM from the ERP system	RTD-3
Procurement Manager Fresh Meat Plant (PMFMP)	Specialised reporting for real-time data, and the availability of different databases	RTD-4
Plant Manager Deli (PMD)	The accessibility of real-time data available any time	RTD-5
Financial Manager (FMW)	The availability of real-time data from ERP system (meat matrix)	RTD-6
Process Manager (PM)	The availability of reports	RTD-7
Stock Control (SC)	Real-time data	RTD-8
Meat Matrix User Operator (MMO)	Real-time data	RTD-9
Participants	Theme: Planning and forecasting (PF)	5
Operation Manager Wholesale (OMW)	Using specialised reports to do forecasting	PF-1
Supervisor Wholesale (SW)	Improve planning	PF-2
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	Fore planning, improve performance	PF-3
Procurement Manager Fresh Meat Plant (PMFMP)	With IT investment, it easy to plan	PF-4
Process Manager (PM)	To produce weekly products	PF-5
Participants	Theme: Communication (COMM)	7
Operation Manager Wholesale (OMW)	he use VOIP technology have made communication more flexible and cost effective	COMM-1
Stock Control (SC)	WhatsApp group chats	COMM-2
Meat Matrix User Operator (MMO)	WhatsApp group, Internal VOIP	COMM-3
Procurement Manager Fresh Meat Plant (PMFMP)	Wi-Fi; VOIP	COMM-4
Plant Manager Deli (PMD)	In the new installation of the 3cx VOIP communication system, Wi-Fi	COMM-5
Financial Manager (FMW)	different platform of communication e.g. WhatsApp Intranet, Wi-Fi	COMM-6
Process Manager (PM)	Different platform of communications VOIP internal Wi-Fi, WhatsApp	COMM-7
Participants	Theme: Efficiency	5
Operation Manager Wholesale (OMW)	Definitely speed up workload	Efficiency-1

Supervisor Wholesale (SW)	Error efficiency real decision, same time	Efficiency-2
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	It increases production	Efficiency-3
Meat Matrix User Operator (MMO)	Accuracy/efficiency	Efficiency-4
Senior Production Manager Deli (SPMD)	Increased flexibility	Efficiency-5
Participants	Theme: Accurate data	4
Operation Manager Wholesale (OMW)	Data get utilised and analysed using data trends by using IT tools to make decisions	Accurate data-1
Supervisor Wholesale (SW)	Accuracy, more information	Accurate data-2
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	The accuracy of information from data available	Accurate data-3
Senior Production Manager Deli (SPMD)	Perishable items need reliable data	Accurate data-4
Participants	Theme: Monitoring and Evaluation ME)	3
Operation Manager Wholesale (OMW)	Subdivide different business units categorised so that decisions can be categorised (departmentalisation)	ME-1
Stock Control (SC)	Production model to be able to determine profit yield and losses	ME-2
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	Reduce time consumption	ME-3

Six themes were derived from the coding as presented in the next table.

Table 4: IT supported decisions

IT supported decisions	Key	N	Percentage
Real-time data	RTD	9	27
Planning and forecasting	PF	5	15
Communication	COMM	7	21
Efficiency	Efficiency	5	15
Accurate data	Accurate data	4	12
Monitoring & Evaluation	ME	3	10
Total		33	100

Twenty-seven percent (27%) of the participants indicated that real-time data (RTD) help support IT decisions. This theme received the highest mentions by the participants from different business units. Twenty-one percent (21%) of the participants showed that communication (COMM) affects

the organisation. Fifteen percent (15%) of the participants state that efficiency and planning and forecasting (PF), respectively, are used to improve how IT impacts decisions. Twelve percent (12%) of the participant indicate how the use of accurate data are used to support decisions. And lastly, 10% of the participants believe that a good IT investment supports decisions in the organisation by monitoring and evaluation.

As discussed in Chapter 2, these results are consistent with the findings of the literature on how IT support decisions and makes information available to improve the quality and speed of decision-making. As shown in the graph, real-time data plays a strategic and important role in supporting decisions. Nikoloski (2014:303) contends that IT plays a role in automating simple, tedious tasks such as Word processing and advanced processes such as production, scheduling and logistics; in this way, IT enables organisation to operate efficiently and profitably. He further explains that IT includes the management information systems (MIS) – computers, hardware, software and networks – used to automate and support organisation tasks and decision-making.

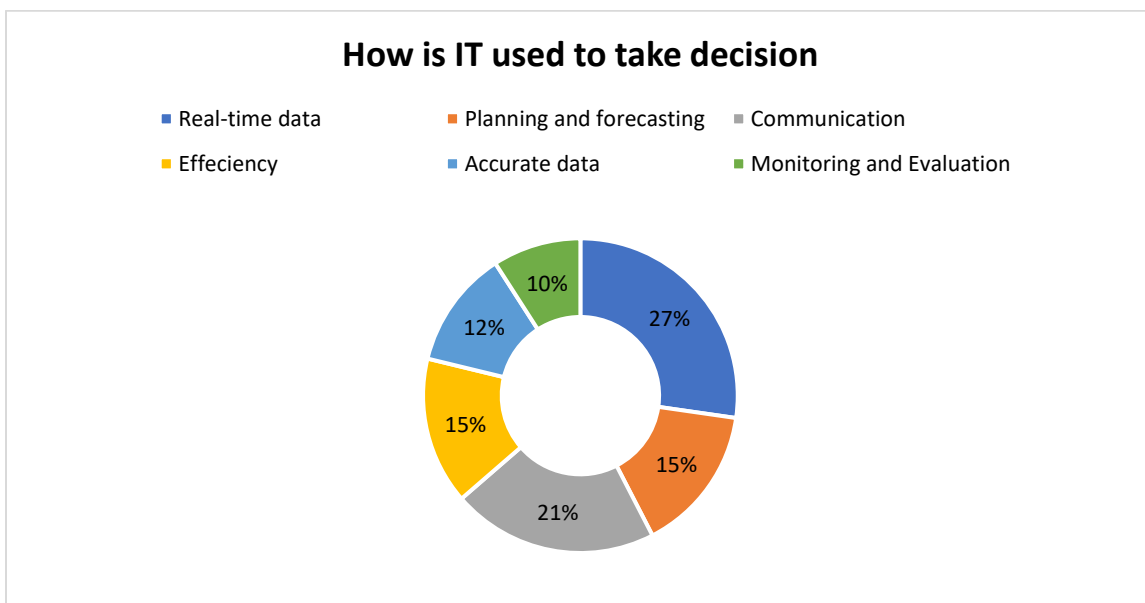


Figure 7: IT supported decisions

The finding about how IT is used to take decisions is that most decisions are based on real-time data as it supports communication.

4.5.2 IT investment benefits

This interview question was to identify how investment in IT benefits the organisation.

Table 5: IT investment benefits themes

Code Analysis		
Participants	Theme: Improve operations (IO)	5
Operation Manager Wholesale (OMW)	Improve from doing it manually to automated time same saving and cost effective.	IO-1
Supervisor Wholesale (SW)	Improve on receiving stock (e.g., meat)	IO-2
Stock Control (SC)	Less human interaction; it also improves operation	IO-3
Process Manager (PM)	Easy to produce; production becomes easy	IO-4
Procurement Manager Fresh Meat Plant (PMFMP)	Time management improves	IO-5
Participants	Theme: Improve productivity /performance (IPP)	8
Operation Manager Wholesale (OMW)	The increase of productivity as the workload of the organisation has increase	IPP-1
Supervisor Wholesale (SW)	Productivity/performance improve	IPP-2
Stock Control (SC)	Productivity more precise; less error and more efficiency; performance more accurate and efficient	IPP-3
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	Productivity /performance improve	IPP-4
Cost + Management Accounts +Systems (CMAS)	All automated extraction of information required	IPP-5
Procurement Manager Fresh Meat Plant (PMFMP)	Also improve planning performance	IPP-6
Plant Manager Deli (PMD)	Improve production and performance	IPP-7
Process Manager (PM)	Performance improved	IPP-8
Participants	Theme: less manual intervention (LMI)	6
Operation Manager Wholesale (OMW)	Elimination of manual intervention (doing things manually) prevented mistakes	LMI-1
Stock Control (SC)	Less human interaction	LMI-2
Meat Matrix User Operator (MMO)	Less manual intervention	LMI-3
Process Manager (PM)	Elimination of manual intervention	LMI-4
Procurement Manager Fresh Meat Plant (PMFMP)	Elimination of manual intervention	LMI-4
Plant Manager Deli (PMD)	Not doing it manually	LMI-6
Participants	Theme: Improve planning (IP)	9
Operation Manager Wholesale (OMW)	Improve accuracy in workload	IP-1
Supervisor Wholesale (SW)	Planning improved	IP-2

Stock Control (SC)	More information available	IP-3
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	It improve the planning in the production	IP-4
Senior Production Manager Deli (SPMD)	Calculating of labour hours	IP-5
Cost + Management Accounts +Systems (CMAS)	Planning improved	IP-6
Procurement Manager Fresh Meat Plant (PMFMP)	Improved planning performance	IP-7
Plant Manager Deli (PMD)	Real-time data available	IP-8
Financial Manager (FMW)	Planning/forecasting	IP-9
Participants	Theme: Improve flexibility (IF)	5
Operation Manager Wholesale (OMW)	Improve flexibility	IF-1
Supervisor Wholsale (SW)	Improve flexibility	IF-2
Stock Control (SC)	Option of doing things better; flexibility	IF-3
Senior Production Manager Deli (SPMD)	Improve flexibility	IF-4
Plant Manager Deli (PMD)	improve flexibility	IF-5
Participants	Theme: Improve decision-making (IDM)	6
Operation Manager Wholesale (OMW)	Decision-making improved	IDM-1
Supervisor Wholsale (SW)	Decision-making improved	IDM-2
Stock Control (SC)	Decision-making improved	IDM-3
Operation Manager Fresh Meat Plant (OMFMP)	Decision-making improved	IDM-4
Financial Manager (FMW)	Decision-making improved	IDM-5
Process Manager (PM)	Decision-making improved	IDM-6
Participants	Theme: Improve efficiency (IE)	8
Operation Manager Wholesale (OMW)	People in the organisation are more effective and efficient	IE-1
Wholesale (SW)	Improved efficiency	IE-2
Stock Control (SC)	Productivity more precise less error and more efficiency; Performance more accuracy and efficiency	IE-3
Cost + Management Accounts +Systems (CMAS)	Improved efficiency	IE-4
Procurement Manager Fresh Meat Plant (PMFMP)	Efficiency	IE-5
Operation Manager Fresh Meat Plant (OMFMP)	Improve efficiency	IE-6
Plant Manager Deli (PMD)	Efficiency	IE-7
Financial Manager (FMW)	Accuracy/efficiency	IE-8

Seven themes were derived from the coding process, as summarised in Table 6.

Table 6: IT benefit themes and occurrences

IT investment benefits themes	Key	N	Percentage
Improve operations	IO	5	11
Improves productivity /performance	IPP	8	17
Less manual intervention	LMI	6	13
Improves planning	IP	9	19
Improves flexibility	IF	5	11
Improves decision-making	IDM	6	13
Improves efficiency	IE	8	17
Total		47	100%

The bar chart below shows an example of how IT investment benefits the organisation. There is a wide spread of themes of how IT investment benefits the organisation. The participants mentioned seven IT investment benefits in their answers – IO, IPP, LMI, IP, IF, IDM and IE – of which only one was not associated with an improvement.

According to the findings, 19% of the participants emphasised that IT investment improves planning (IP) in the organisation. It is also revealed that IT investment improves operation (IO) and flexibility (IF) by 11% each. Investment in IT improves productivity/performance (IPP) and flexibility (IF) by 17% each in the given production environment. On the other hand, it is indicated that 13% of the participants state that IT investment insures there is less manual intervention (LMI). And finally, 13% of the participants indicate improved decision-making (IDM).

As discussed in Chapter 2, as shown in the table and graph below, organisation investment in IT contributes directly to its benefits. The results shown in the graph are consistent with studies carried out by Liu and Chen (2004:3) examining IT investment from an organisational perspective: IT improves the efficiency and effectiveness of an organisation by reducing the bounded rationality of decision-making. Mikulski (2014:303) suggests that in many ways technology has forced organisations to stay flexible, adapting their operations to newer and better technological advances. Thus, by using these tech-tools, organisations and employees enjoy a number of business-related benefits.

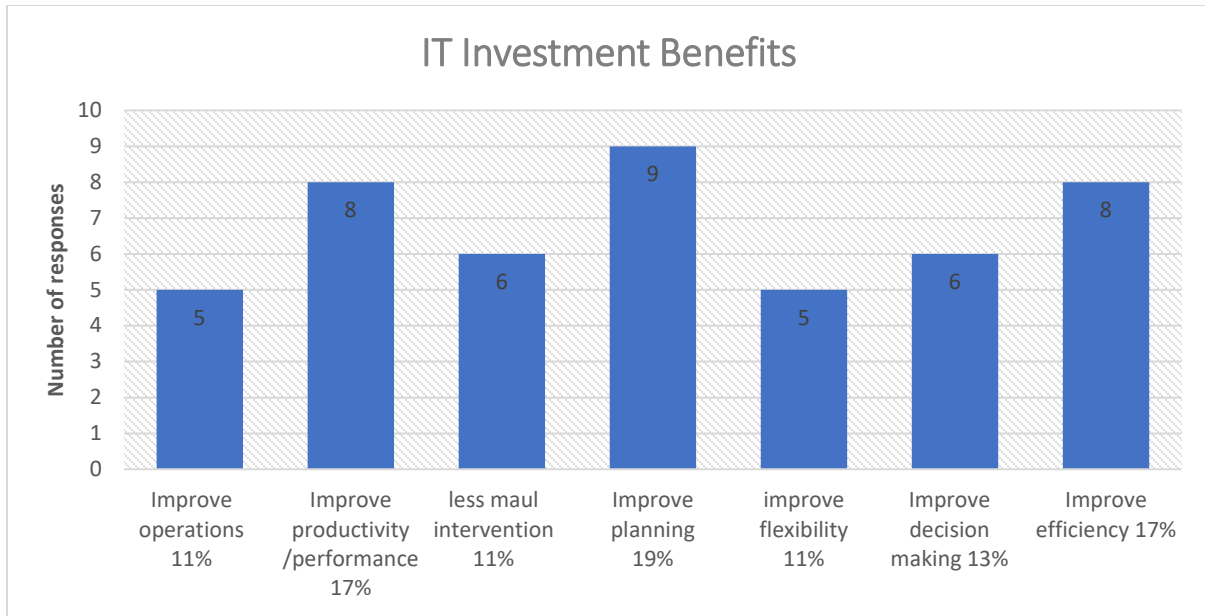


Figure 8: IT investment benefits

The finding relating to how IT benefits the organisation is that planning, productivity, performance and efficiency are all improved.

4.5.3 IT Investment decision

The third interview question explored how IT investment influences decisions in the organisation.

Table 7: Coding of the influence of IT investment decisions

Participants	Theme: Real-time data availability/Integrity (RTD)	
Operation Manager Wholesale (OMW)	It varies from one department to other e.g., boxed department (frozen boxes) mostly invoicing for external orders	RTD-1
Supervisor Wholesale (SW)	MM in-house business software specially designed for the organisation	RTD-2
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	Have the real-time data available; info available from ERP system to determine the profit and loss in production	RTD-3
Meat Matrix User Operator (MMO)	Real-time data (make it easy to do planning)	RTD-4
Senior Production Manager Deli (SPMD)	ERP systems are used make proper decisions from information available	RTD-5
Cost + Management Accounts +Sys (CMAS)	Real-time data availability	RTD-6
Procurement Manager Fresh Meat Plant (PMFMP)	Using real-time data (the integrity of data to make decisions)	RTD-7
Operation Manager Fresh Meat Plant (OMFMP)	Depends on data available from MM and other ERP systems in the organisation (integrity of the information)	RTD-8
Plant Manager Deli (PMD)	Integrity of information available gives the business the guidance in <i>what</i> and <i>how</i> decisions	RTD-9
Financial Manager (FMW)	The business can depend on the available from MM (integrity of data) as reliable	RTD-10
Process Manager (PM)	Reliability of data from MM	RDR-11
Participants	Theme: Forecasting (FC)	
Operation Manager Wholesale (OMW)	Forecasting labour using time sheet	FC-1
Supervisor Wholesale (SW)	Information available to make better decisions and to plan	FC-2
Stock Control (SC)	Influence forecast stock requirement positively; influence forecast delivery vehicles to do deliveries	FC-3
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	Have the real-time data available; info available from ERP system to determine profit and loss in production	FC-4
Meat Matrix User Operator (MMO)	Real-time data (make it easy to do planning)	FC-5
Senior Production Manager Deli (SPMD)	ERP systems are used make proper decisions from info available	FC-6
Cost + Management Accounts +Sys (CMAS)	Real-time data availability	FC-7
Procurement Manager Fresh Meat Plant (PMFMP)	Improve planning in the fresh meat plant; important for Woolworth orders	FC-8
Operation Manager Fresh Meat Plant (OMFMP)	Planning of production in plant e.g., forecasting	FC-9
Participants	Theme: Increase productivity (IP)	
Operation Manager Wholesale (OMW)	Influencing production planning	IP-1
Supervisor Wholesale (SW)	Increase productivity	IP-2

Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	Tech definitely improves the production situation more production	IP-3
Operation Manager Fresh Meat Plant (OMFMP)	Increase of production output	IP-4
Plant Manager Deli (PMD)	With tech better, decisions can be taken which improve production in Deli	IP-5
Process Manager (PM)	Accuracy of work done	IP-6
Participants	Theme: Efficiency of how work IS performed 19%	EWP
Operation Manager Wholesale (OMW)	Delivery truck schedule to a correct route mornings and afternoons	EWP-1
Supervisor Wholesale (SW)	The use of new technology e.g., scanning tool (improve stock taking); group chat with WhatsApp technology (dealing with queries)	EWP-2
Stock Control (SC)	Using specialised software and technology hardware (to determine weight loss of meat products while delivering the product) plays an important role in pricing of meat products	EWP-3
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	Efficiency of planning	EWP-4
Meat Matrix User Operator (MMO)	Speeds up process when doing work	EWP-5
Cost + Management Accounts +Sys (CMAS)	Improve decisions in given environment	EWP-6
Process Manager (PM)	Efficiency in how work is performed	EWP-7

The coding process resulted in five themes, as presented in Table 8.

Table 8: IT Investment decision

IT Investment decision themes	Key	N	Percentage
Forecasting	FC	9	25
Real-time data availability /Integrity	RTD	11	31
Increase productivity	IP	6	17
Also efficiency on how work IS performed	EWP	7	19
Increase flexibility	IF	3	8
Total		36	100

The pie graph below visually presents the occurrences with themes. There was a wide spread of themes in terms of how IT investment influences decisions in the organisation. The participants mentioned five IT investment decisions in their answers: forecasting (FC); real-time data availability/integrity (RTD); increased productivity (IP); efficiency of how work IS performed (EWP); and increased flexibility (IF).

From the pie chart, it follows that 31% of the participants stated that real-time data availability and integrity influences IT investment decisions. This shows that this benefit is the most mentioned by the participants. The figure below highlights 25% of the participants stated that forecasting influence IT investment decisions. The pie graph shows that 19% of participants indicated that it positively influences how efficiently work is performed. Figure 10 further illustrates that 17% indicated an increases in productivity and a further 8% an increase in flexibility, which is the lowest factor of IT investment influencing decisions in the organisation.

In conclusion, real-time data availability/integrity and forecasting are the highest identified factors that influence IT investment decisions. Flexibility is the lowest of the five themes that influences IT investment decision. In future, we may see more and more participants who would be using real-time data availability/integrity and forecasting in their respective business units that will influence their decision for investing in IT.

The more the technology is used in the organisation, the greater the dependency on it. This study reveals, as shown in the figure below, that real-time data availability/integrity plays an important role. It received, in fact, the highest response from participants. These findings can be compared, as stated in Chapter 2, to Sheng and Mykytyn (2002:136) who explain that different managers find themselves having to make quick and sharp business decisions every day. For this reason, business managers need high quality data in their decision-making process.

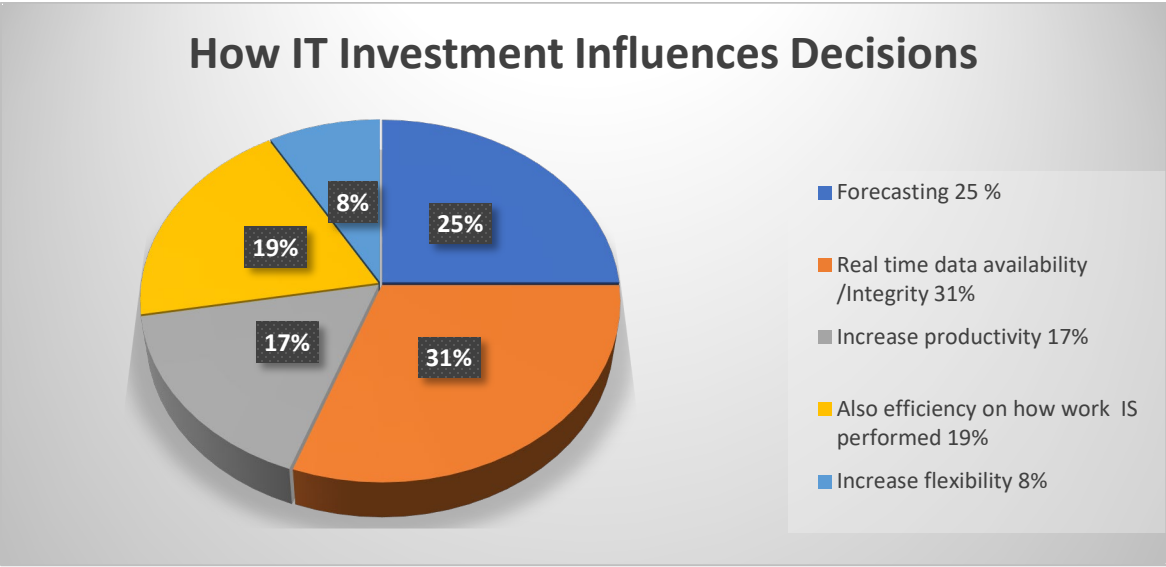


Figure 9: How IT investment influence decisions

The finding with regards to how IT investment influences decisions is that the availability of real-time data assists with forecasting .

4.5.4 IT investment benefit example

The interview question for IT investment examples is as follows: Please provide an example of how IT investment benefits a decision in the organisation – what was the outcome? The following excerpt shows an example of the coding.

Table 9: IT investment benefits coding

Code Analysis Question 4: IT Investment Benefit Example		
Participants	Theme: Base decision provided from new application (models)	6
Operation Manager Wholesale (OMW)	Gives a same time order, end of day reconciliation	MODELS-1
Senior Production Manager Deli (SPMD)	Determines the yield; it is easy to determine the yield	MODELS-2
Procurement Manager Fresh Meat Plant (PMFMP)	Planning of procurement of meat (stock) raw material	MODELS-3
Financial Manager (FMW)	Volume growth; the specialised reports allow real-time decisions	MODELS-4
Process Manager (PM)	Gives a positive production yield	MODELS-5
Operation Manager Fresh Meat Plant (OMFMP)	Data available from MM e.g., it provides pricing and detailed information about the proposed product before the manufacturing	MODELS-6
Participants	Theme: Time management (TM)	1
Operation Manager Fresh Meat Plant (OMFMP)	Because of the ERP system, less time doing things	TM-1
Participants	Theme: New software adoption (improve workflow) (NSA)	6
Operation Manager Wholesale (OMW)	Meat Matrix (MM): the current business system which is used in the organisation; in addition to the (MM) business system, a logistics model creates an advantage to the current business environment	NSA-1
Supervisor Wholesale (SW)	Bar-codes cereal number	NSA-2
Cost + Management Accounts +Systems (CMAS)	Did a system development (customise) on the current system meat matrix (MM), rewriting the revaluation for stock, calculating the cost for new product development in the fresh meat plant	NSA-3
Plant Manager Deli (PMD)	Upgrade on the manufacturing model, deli model	NSA-4
Financial Manager (FMW)	Drawing up budget extract info from reports	NSA-5
Process Manager (PM)	New software adoption (improve workflow)	NSA-6
Participants	Theme: Upgrade of ERP system (added additional models) (UERPS)	3

Operation Manager Wholesale (OMW)	This model (logistic model) improves the process flow from picking (creating and order) to moving stock to an external customer which speeds up the process of delivering	UERPS-1
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	Work out the cost, determine the profit by using the ERP cost system	UERPS-2
Meat Matrix User Operator (MMO)	When picking and ordering, you verify it on Meat Matrix (MM)	UERPS-3
Participants	Theme: Improve flexibility (IF)	
Stock Control (SC)	Improves flexibility	IF-1
Meat Matrix User Operator (MMO)	Add orders at the same time (for production)	IF-2
Senior Production Manager Deli (SPMD)	Its benefits or highlights the process, method, machine, people and raw material	IF-3
Financial Manager (FMW)	Performance adjust targets	IF-4
Process Manager (PM)	Customer orders make changes on the last minute	IF-5
Participants	Theme: New product development (NPD)	2
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	Take lamp: working out the actual cost; cutting disproportion it a different section	NPD- 1
Process Manager (PM)	This allows a reconciliation of expenses accrued in relating with new product	NPD- 2
Participants	Theme: minimise operational cost (MOC)	1
Stock Control (SC)	Low operational cost minimised	MOC-1
Participants	Theme: IT hand tools integrated with ERP system (ITHT)	1
Stock Control (SC)	Box digitisation with these products is received and dispatch product using IT tools e.g., scanners	ITHT-2
Participants	Theme: Specialised reports (SR)	4
Operation Manager Wholesale (OMW)	Forecasting is easier for future orders with different customers	SR-1
Meat Matrix User Operator (MMO)	Go back the following day to verify orders	SR-2
Du Plessis Plant Manager Deli (PMD)	ERP system provides accurate data and information when the production plant is overconsuming in the packaging and production	SR-3
Financial Manager (FMW)	Reports provide real-time data (to correct pricing)	SR-4
Participants	Theme: Accuracy	4
Operation Manager Wholesale (OMW)	Accuracy	Accuracy-1

Cost + Management Accounts +Systems (CMAS)	The system provides accuracy and efficiency, expiring when I configure the ERP system	Accuracy-2
Procurement Manager Fresh Meat Plant (PMFMP)	For accuracy	Accuracy-3
Plant Manager Deli (PMD)	Provides efficiency in the production environment	Accuracy-4
Participants	Theme: Efficiency	3
Cost + Management Accounts +Systems (CMAS)	The system provides accuracy and efficiency, expiring when I configure the ERP system	Efficiency-1
Procurement Manager Fresh Meat Plant (PMFMP)	Efficiency of work output	Efficiency-2
Plant Manager Deli (PMD)	Provides efficiency in the production environment	Efficiency-3

The coding process resulted in 11 themes and the associated number of occurrences appears in Table 10.

Table 10: IT investment benefit examples

IT investment benefit example	Key	N	Percentage
Base decision provided from new application	MODELS	6	17
Time management	TM	1	3
New software adoption (improve workflow)	NSA	6	17
Upgrade of ERP system (added additional models)	UERPS	3	8
Improve flexibility	IF	5	14
New product development	NPD	2	6
Minimised operational cost	MOC	1	3
IT hand tools integrated with ERP system	ITHT	1	3
Specialised reports	SR	4	11
Accuracy	ACCURACY	4	11
Efficiency	Efficiency	3	8
TOTAL		36	100

A base decision provided from new applications as well as new software both represent 17% as examples of how IT investment benefits a decision in the organisation; it is also the highest IT investment benefit example. The second highest example, from 14% of the participants, is the improvement of flexibility (IF). Next, 11% of the participants state that accuracy and specialised reports (SR) are examples of IT investment benefits. Eight percent (8%) provide as examples of

IT investment benefits the upgrade of the ERP system (UERPS) and efficiency. This is followed by new product development (NPD) as another example of how IT investment benefits a decision, indicated by 6%. Time management (TM), minimised operating costs (MOC) and IT hand tools integrated with the ERP system (ITHT) were examples by the smallest percentage of participants. This study revealed that only 17% of the participants base their decision on using new applications and new software adoption (for improved workflow), respectively. On the other hand, 11% of the participants responded by identifying the use of specialised reports. This is consistent with the findings in the literature with examples of how IT investment benefits an organisation. Many organisations have used software, different types of advanced applications, computers and the Internet to transform their organisation from local places of business to national and global market competitors (Nikoloski, 2014:303). As discussed in Chapter 2, this is consistent with the findings in literature which provide examples of how IT investment benefits decisions in the organisation. According to Maziliauskas (2017:5), innovation of new products or services are targeted at satisfying a need in the market.

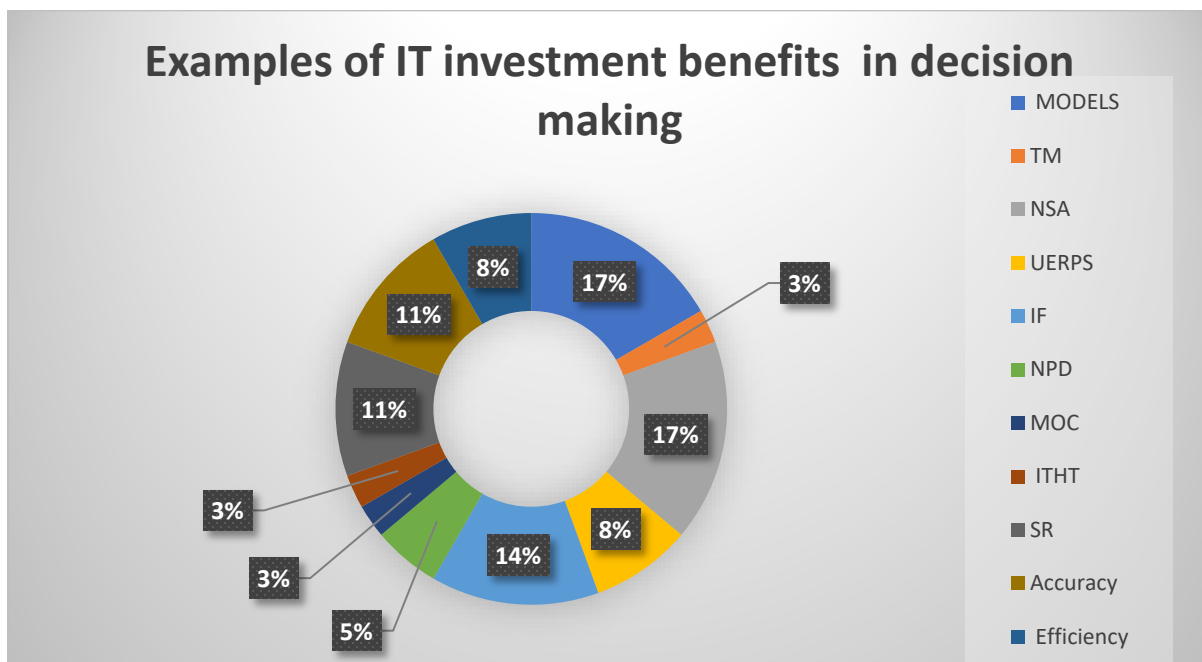


Figure 10: IT Investment benefit examples

The finding regarding the examples provided of how IT investment benefits decision-making is predominantly to support decisions for new applications and software.

4.5.5 IT investment challenges

The interview question that deals to identify challenges is as follows: What are challenges experienced with IT investment in the organisation?

Table 11: IT investment challenges

Code Analysis Question 5: IT investment challenges		
Participants	Theme: Skills	6
Operation Manager Wholesale (OMW)	With IT investment, business unit workloads are more specialised	SKILL-1
Supervisor Wholesale (SW)	The work environment became specialised, special skills required	SKILL-2
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	A system delay in specialised skills required to operate MM	SKILL-3
Operation Manager Fresh Meat Plant (OMFMP)	System error can only be fixed by a specialised skill; it is hardcoded	SKILL-4
Plessis Plant Manager Deli (PMD)	Specialise skills; external support on the ERP system	SKILL-5
Process Manager (PM)	Skill problem	SKILL-6
Participants	Theme: System Errors	7
Supervisor Wholesale (SW)	As work is based on using the business system, it is difficult to solve system error problems immediately; it requires specialised skills to solve system errors	System Errors-1
Stock Control (SC)	Initial system errors (IT related) can affect the business negatively	System Errors-2
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	System error outside support	System Errors-3
Procurement Manager Fresh Meat Plant (PMFMP)	ERP system errors need specialised skill to support	System Errors-4
Plant Manager Deli (PMD)	System stability	System Errors-5
Financial Manager (FMW)	Support on MM if error (outside support)	System Errors-6
Process Manager (PM)	The slow printing of certain reports (system error)	System Errors-7
Participants	Theme: Slow Update	4
Meat Matrix User Operator (MMO)	Sometimes the system is slow (ERP system)	Slow Update-1
Senior Production Manager Deli (SPMD)	The upgrade of the current ERP system to additional model which can do the planning in the production environment (AI)	Slow Update-2
Cost + Management Accounts + Systems (CMAS)	Part of the application e.g., MM software is hard coded; need programmer to make decisions; no SQL developer on site	Slow Update-3

Financial Manager (FMW)	The time delay in implementing new technology; buy-in from top management	Slow Update-4
Participants	Theme: Slow Output	4
Supervisor Wholesale (SW)	Respond time fixing system error problems	Slow Update-1
Meat Matrix User Operator (MMO)	Sometimes experiencing Wi-Fi issues	Slow Update-2
Operation Manager Fresh Meat Plant (OMFMP)	Some reports are too complicated from the ERP system; need to be simplified	Slow Update-3
Stock Control (SC)	Ad hoc implementations	Slow Update-4
Participants	Theme: Expensive	1
Stock Control (SC)	Could be very expensive	Expensive

Five themes were derived based on the responses, as presented in Table 12.

Table 12: IT Investment benefit examples

IT investment challenges	Key	N	Percentage
Skills	SKILL	6	27
System Errors	SYSTEM ERRORS	7	32
Slow Update	SLOW UPDATE	4	18
Slow Output	SLOW OUTPUT	4	18
Expensive	EXPENSIVE	1	5
Total		22	100

This pie chart shows the challenges experienced with IT investment in the organisation. The figures are given as percentages (Table 4.5 and Figure 4.6). Overall, there was a wide spread of IT investment challenges identified. A total of five themes were mentioned by the participants from the different business units (answers as indicated in Appendix E: data analysis coding): SKILL, SYSTEM ERRORS, and SLOW UPDATE, SLOW OUTPUT and EXPENSIVE.

According to the findings, 27% of the participants emphasised that challenges like skill are problematic with IT investment. On the other hand, as shown in Figure 4.6, 32% of the participants state system errors as a challenge with IT investment in the organisation. The data make evident that system error received the highest mention by participants. Overall, a similar percentage to IT investment challenges, as indicated from the pie chart, comes from two themes: slow update and slow output, at 18% respectively. And finally, it is concluded that 8% of the participants state that

it is expensive. This is the lowest percentage challenge as experienced with IT investment in the organisation.

As discussed in Chapter 2, this is consistent with the findings in literature on challenges related to IT investment in an organisation. As shown in the graph, 32% of the participants identified system errors as a challenge with IT investment in the organisation; this is the highest. Our findings show that system errors can only be solved by outside consultants as this requires specialised skills. Ghobakhloo et al.(2011:67) believe that small organisations do not have specialised expertise or skills to support specialised software or applications. According to Ghobakhloo et al. (2011:67), advanced technology requires the engagement of consultants to support specialised applications and unfortunately this is often not possible with small businesses.

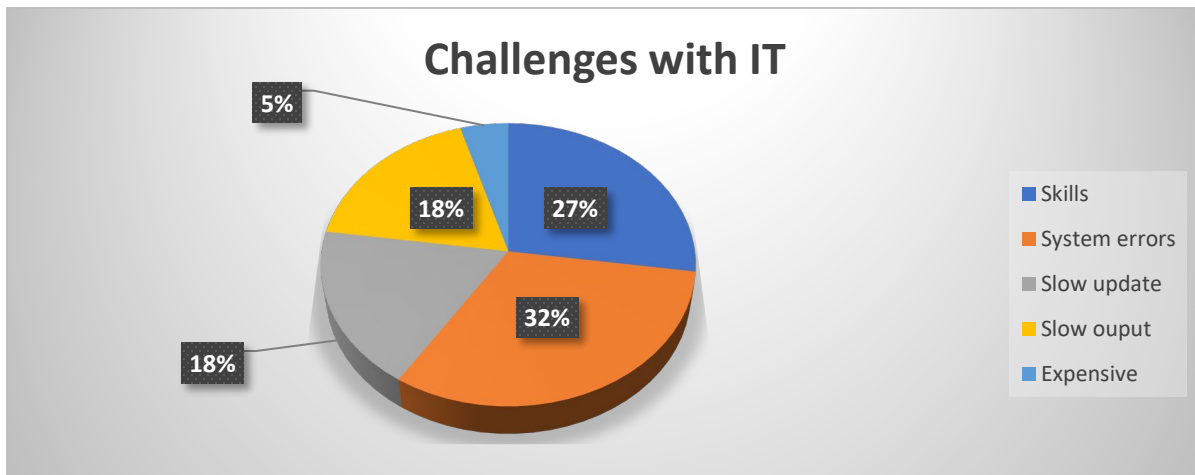


Figure 11: IT investment challenges

The finding relating to the challenges experienced with IT investment is system errors, lack of skills, slow uptake and updates.

4.5.6 Challenges influence on decisions

The question that establishes the challenges that influence decisions is as follows: How do the challenges of IT investment influence decisions?

Table 13: Challenges influencing decisions

Code Analysis Question 6: Challenges influencing decisions		
Participants	Theme: Meat Matrix (ERP system errors) influence on decisions	8
Supervisor Wholesale (SW)	A complete standstill of work and productivity because of system error; MEAT MATRIX	MMEI D-1
Stock Control (SC)	Outside vendors for adoption/fix errors on software	MMEI D-2

Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	It negatively influences decisions as system error	MMEI D-3
Meat Matrix User Operator (MMO)	Have to adjust things manually as system is down	MMEI D-4
Cost + Management Accounts +Systems (CMAS)	Need outside consultant to fix problem	MMEI D-5
Operation Manager Fresh Meat Plant (OMFMP)	Waiting on outside support to fixed errors	MMEI D-6
Financial Manager (FMW)	Outside support	MMEI D-7
Process Manager (PM)	Having specialised knowledge for support	MMEI D-8
Participants	Theme: Hardware errors/database/data/scanners – problems influence decisions (HDDS)	10
Operation Manager Wholesale (OMW)	Real-time decisions to be taken could lead to other risks; copying of wrong data	HDDS-1
Supervisor Wholesale (SW)	Network platform faults	HDDS-2
Stock Control (SC)	Some of problems are out of your control with IT	HDDS-3
Meat Matrix User Operator (MMO)	Scanners give problems sometimes	HDDS-4
Senior Production Manager Deli (SPMD)	Sometimes experiencing slowness when running reports	HDDS-5
Cost + Management Accounts +Systems (CMAS)	It could delay decision-making issues with network	HDDS-6
Procurement Manager Fresh Meat Plant (PMFMP)	Delays decision-making; impact on work output if database is offline	HDDS-7
Operation Manager Fresh Meat Plant (OMFMP)	Can't make decisions immediately; conflict with scanners and IP addresses	HDDS-8
Plant Manager Deli (PMD)	Negatively; information is not available real-time to make necessary decisions	HDDS-9
Process Manager (PM)	Real-time data not available	HDDS-10
Participants	Theme: Limited skill to operate ERP system and other software which influence decisions (INFLUENCE)	6
Operation Manager Wholesale (OMW)	Must be proactive regarding skill labour	INFLUENCE-1
Supervisor Wholesale (SW)	It disrupts productivity and performance	INFLUENCE-2
Stock Control (SC)	Requires specialised skills	INFLUENCE-3
Senior Production Manager Deli (SPMD)	SYSTEM ERRORS: when the system is down, it can only be fixed by specialised skill	INFLUENCE-4
Financial Manager (FMW)	Skill problem	INFLUENCE-5

Process Manager (PM)	Skill problem	INFLUENCE-6
Participants	Theme: VOIP Technology/communication tools/Wi-Fi (COMMTECH)	3
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	Phone quality because of using VOIP; sometimes bad	COMMTECH-1
Operation Manager Fresh Meat Plant (OMFMP)	We could have basic issues with hardware e.g., phone after hours	COMMTECH-2
Plessis Plant Manager Deli (PMD)	Wi-Fi errors effect the scanners in production environment	COMMTECH-3

This part of the secondary question was to identify how investment in IT affects an organisation. So the following question was asked: How do the challenges of IT investment influence the decisions in the organisation? From our findings and analyses, we obtained the information as presented in Table 4.6 and Figure 4.7 below.

Table 14: Themes and occurrences of challenges that influence

Challenges influence on decisions	Key	N	Percentage
Meat Matrix (ERP System) errors influence on decisions	MMEID	8	30
Hardware errors/database /data /scanner problems influence decisions	HDDS	10	37
Limited skill to operate ERP system and other software which influences decisions	INFLUENCE	6	22
VOIP technology/communication tools/Wi-Fi	COMMTECH	3	11
Total		27	100

The horizontal bar chart in Figure 4.7 illustrates IT investment for decisions in terms of how challenges influence decisions.

Thirty-seven percent (37%) of the participants are of the opinion that hardware errors, database, data and scanner (HDDS) problems influence decisions. Thirty percent (30%) of the participants claim that challenge such ERP system errors influence decisions. Twenty-two percent (22%) of the participants indicate limited skills to operate the ERP system and other software influencing IT investment decisions.

HDDS hardware-related errors is at 37% – the highest. This is in line with discussions in Chapter 2 and consistent with the findings in literature pertaining to how IT investment influences decisions.

In regard to MMEID enterprise resource planning (ERP) as the second highest error (noted by 30% of the respondents), it is clear that system errors can only be solved by outside consultants (see Chapter 2, section 2.9.4).

The findings reveal that the current business system (ERP) shows that only 22% of the participants have skill issues operating the system. As discussed in Chapter 2, the technology acceptance model, this is consistent with the findings in the literature on how users in organisations adapt to the acceptance of new technologies.

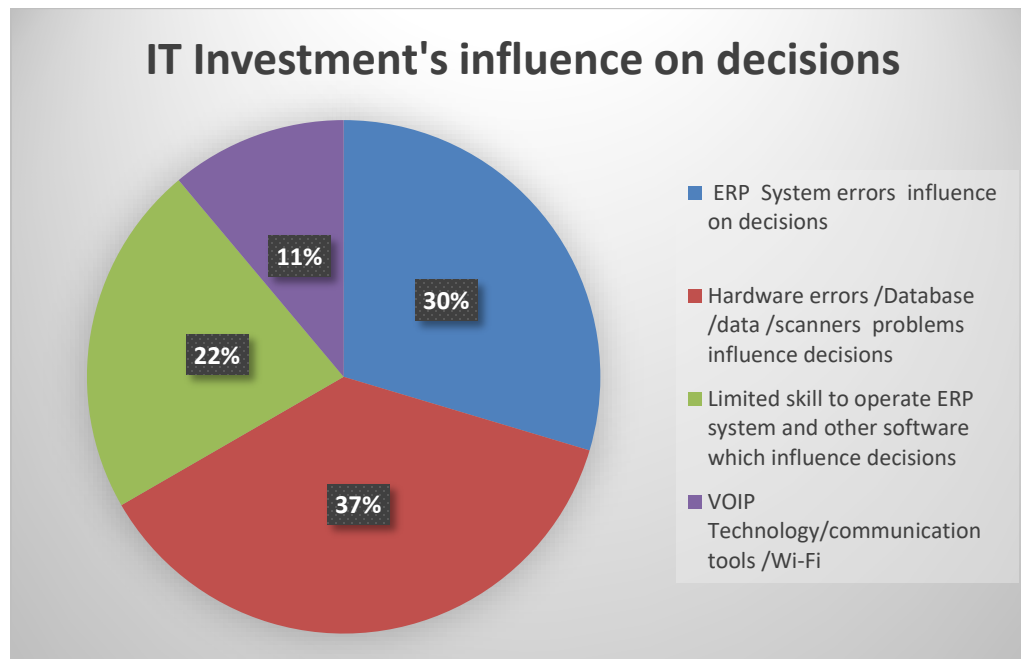


Figure 12: Challenges that influence decisions

The finding relating to the influence of the challenges on the decision-making in an organisation relates primarily to hardware errors, database, data and scanner problems, as well as ERP system errors.

4.5.7 Challenge example

The interview question to identify challenges with IT investment is as follows: Please provide an example of a challenge with the IT investment that influences a decision – what was the outcome?

Table 15: Examples of challenges coding

Code Analysis Question 7: Challenge example		
Participants	Theme: Intermittent IT errors/freezing/slowness (IFS)	3
Senior Production Manager Deli (SPMD)	Wi-Fi related issues in the production environment	IFS-1
Plant Manager Deli (PMD)	IP address change can cause challenges and security issues	IFS-2
Process Manager (PM)	The slowness of the system	IFS-3
Participants	Theme: Skill	3
Operation Manager Wholesale (OMW)	Extracted data from database using the wrong date to plan production	SKILL-1
Meat Matrix User Operator (MMO)	New product loaded; has to be added	SKILL-2
Financial Manager (FMW)	Pastel evolution: specialised skills required to integrate with MM	SKILL-3
Participants	Theme: Specifically ERP support	9
Operation Manager Wholesale (OMW)	MEAT MATRIX supports if errors	ERPSUP-1
Supervisor Wholesale (SW)	Example reports: price difference of incoming stock and purchase price	ERPSUP-2
Stock Control (SC)	System error calculation tables in the business system create a miscalculation which has a negative effect, revenue loss	ERPSUP-3
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	The information is provided on stock sheets (MM)	ERPSUP-4
Meat Matrix User Operator (MMO)	Cannot log on to the MM ERP system as the system is down; not able to pick (processing an order)	ERPSUP-5
Cost + Management Accounts +Systems (CMAS)	Example: the label design was hard-coded; needed a new development	ERPSUP-6
Procurement Manager Fresh Meat Plant (PMFMP)	Error on the system (not able get data immediately) has to be verified manually	ERPSUP-7
Financial Manager (FMW)	Software has been implemented without proper testing in the ERP system (MM)	ERPSUP-8
Operation Manager Fresh Meat Plant (OMFMP)	In the production environment, the loop tags the ERP the system; verifies a wrong product; a serial duplication	ERPSUP-9

Three themes were derived from the coding process; the number of occurrences were calculated.

Table 16: Examples of challenges

Challenge example	Key	N	Percentage
Intermittent IT errors/freezing/slowness	IFS	3	20
Skill	SKILL	3	20
Specifically ERP support	ERPSUP	9	60
Total		15	100

The pie graph in Figure 4.8 illustrates IT investment in relation to participant examples of challenges with IT investment that influence a decision.

The information presented in Table 16 and Figure 14 refers to participant responses to the question: provide an example of a challenge with IT investment that influences a decision. As shown in Figure 4.8, a similar percentage of participants noted examples of challenges that influence decisions: IFS and skill are at 20%, respectively. And finally, 60% are of an opinion that ERPSUP (see Table 4.7) is the highest percentage of example of a challenge with IT investment that influences decision-making.

This section focuses on challenges of IT investment that influence decisions, similar to the question in section 4.3.6. As shown in Figure 4.8, an example of a challenge which influences decisions is Meat Matrix (MM), the organisation’s current ERP system, with 60% of the participants responding to the need for ongoing support. It is dependent on specialised external upkeep. Ongoing intermittent hardware-related issues were as discusses previously in section 4.3.6

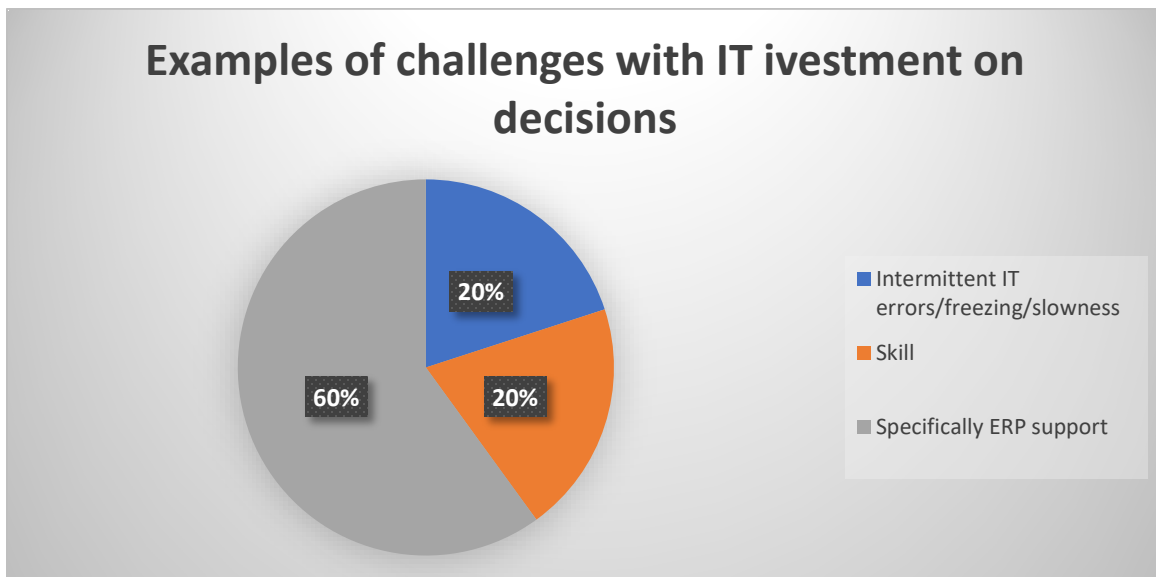


Figure 13: Example of a challenge with the IT investment that influences a decision

The finding relating to the challenges with IT investment on decision-making is primarily for ERP support.

4.5.8 IT investment for decision-making suggestion

The interview question to obtain suggestions from the participants is as follows: What would, in your opinion, be a good IT investment for decision-making in the organisation?

Table 17: Suggestions for IT investment decisions

Code Analysis		
Participants	Theme: Adoption of new hardware/network architecture improve/database (AHND)	11
Operation Manager Wholesale (OMW)	The scanning system in the plant (internal) for stock control	AHND-1
Supervisor Wholesale (SW)	New hardware	AHND-2
Stock Control (SC)	Scales	AHND-3
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	Time attendance system technology	AHND-4
Meat Matrix User Operator (MMO)	Introduction of BIB scanners (an all-in-one with monitor and touch screen; wireless)	AHND-5
Senior Production Manager Deli (SPMD)	Intranet	AHND-6
Cost + Management Accounts +Systems (CMAS)	Implementation of database reporting systems separate and hardware	AHND-7
Procurement Manager Fresh Meat Plant (PMFMP)	The integrity of data available from different databases in the organisation	AHND-8
Plant Manager Deli (PMD)	Intranet	AHND-9
Financial Manager (FMW)	Upgrade of the IT platform	AHND-10
Process Manager (PM)	New data base for the reporting and archive	AHND-11
Participants	Theme: Implementation and upgrade of the communication tools/VOIP/Wi-Fi (IUVW)	6
Operation Manager Wholesale (OMW)	3cx system with VOIP system using the mobile phone as an internal call; direct contact with driver	IUVW-1
Meat Matrix User Operator (MMO)	VOIP in the production area	IUVW-2
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	Wi-Fi and data phones in the production environment helps	IUVW-3
Meat Matrix User Operator (MMO)	VOIP in the production area	IUVW-4
Operation Manager Fresh Meat Plant (OMFMP)	WIFI	IUVW-5
Plant Manager Deli (PMD)	Communication tech improved including Wi-Fi in the production area	IUVW-6

Participants	Theme: Upgrade of ERP system (UERP)	8
Operation Manager Wholesale (OMW)	Meat Matrix the additional models	UERP-1
Supervisor Wholesale (SW)	New reporting; the Trac Scale reports new model on ERP	UERP-2
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	Stock sheets available from the ERP system	UERP-3
Senior Production Manager Deli (SPMD)	The MM	UERP-4
Procurement Manager Fresh Meat Plant (PMFMP)	The MM ERP system in the organisation	UERP-5
Operation Manager Fresh Meat Plant (OMFMP)	Meat Matrix (MM) ERP	UERP-6
Plant Manager Deli (PMD)	The ERP system	UERP-7
Financial Manager (FMW)	Integrating of BI reporting with MM and Pastel Evolution	UERP-8
Process Manager (PM)	The implementation of the costing system	UERP-9
Participants	Theme: Implementation of new software(INS)	11
Operation Manager Wholesale (OMW)	Vehicle tracking system software directly link to the delivery vehicles	INS-1
Supervisor Wholesale (SW)	The implementation of new software	INS-2
Stock Control (SC)	The implementation of Track Scale in the organisation; saving cost regarding the weight loss of meat to determine the actual weight when buying in and selling to retailers	INS-3
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	The MM implementation (different models)	INS-4
Senior Production Manager Deli (SPMD)	Time and attendance	INS-5
Cost + Management Accounts +Systems (CMAS)	The BI reporting	INS-6
Procurement Manager Fresh Meat Plant (PMFMP)	Also the business intelligence reports helps, which still need to be fine tuned	INS-7
Operation Manager Fresh Meat Plant (OMFMP)	BI reporting; helps business to make decision	INS-8
Plant Manager Deli (PMD)	Time attendance management system	INS-9
Financial Manager (FMW)	The implementation of the BI reporting	INS-10
Process Manager (PM)	And the BI reporting system	INS-11

Four themes were derived and the number of occurrences was allocated, as indicated in Table 18.

Table 18: IT investment for decision-making suggestion

IT investment for decision-making suggestion	Key	N	Percentage
Adoption of new hardware/network architecture improved/database	AHND	11	30
Implementation and upgrade of the communication tools/ VOIP/Wi-Fi	IUVW	6	16
Upgrade of ERP system	UERP	9	24
Implementation of new software	INS	11	30
Total		37	100

The horizontal bar chart (Figure 4.9 below) shows how participants were asked what would be, in their opinion, a good IT investment for decision-making in the organisation. There was a wide spread of what is considered to be a good IT investment for decision-making in the organisation.

Two themes have the same percentage allocated, namely 30%. These are adoption of new hardware/network architecture improved/database, and the implementation of new software. These two themes are mentioned the most by the participants. Twenty-four percent (24%) are of the opinion that a good IT investment for decision-making in the organisation is the upgrading of the ERP system (UERP), while 16% of the participants suggest that implementation and upgrade of the communication tools/VOIP/Wi-Fi are a good IT investment but mentioned by the fewest number of participants.

The findings show that the adoption of hardware and the implementation of software garnered the highest number of responses from participants.

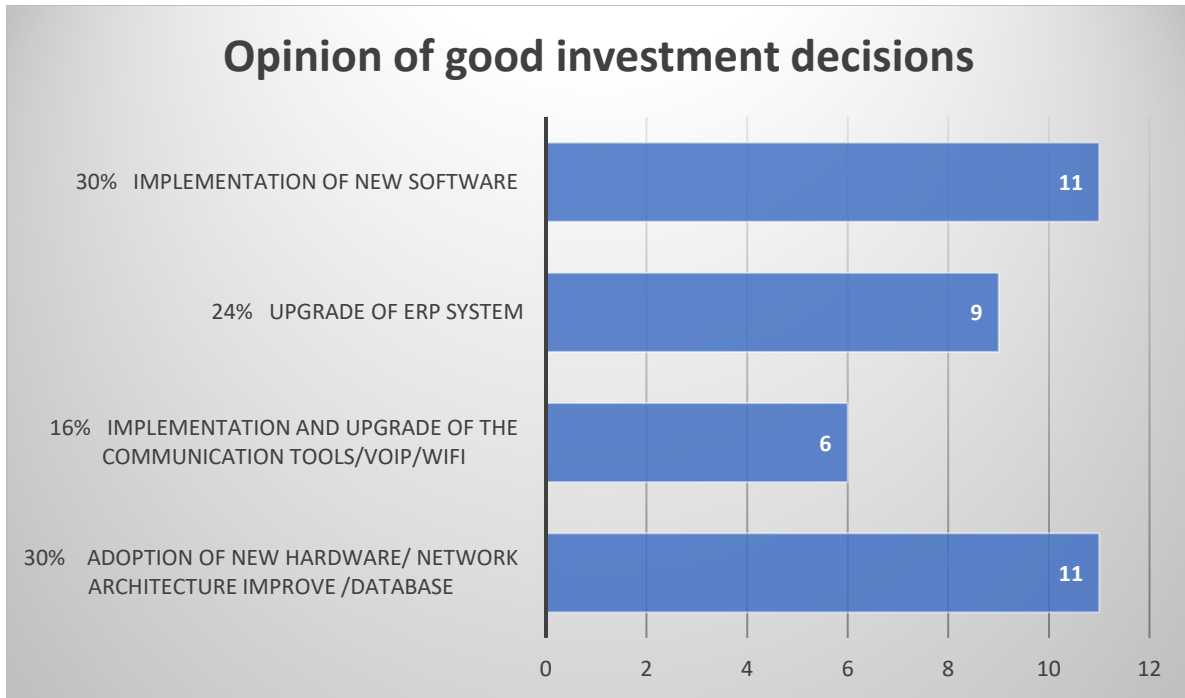


Figure 14: IT investments for decision-making suggestions

The finding related to suggestions for good IT investments is to consider the adoption of new hardware/network architecture improved/database, and the implementation of new software.

4.5.9 Examples of IT investments in the organisation

The interview question to determine the IT investments in the organisation is as follows: What are the IT investments in the organisation?

Table 19: Coding of the examples based on participant responses

Code Analysis		
Participants	Theme: Hardware	7
Supervisor Wholesale (SW)	Scanning tool; label printers; VOIP technology	Hardware- 1
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	The inline scanners wireless less	Hardware- 2
Meat Matrix User Operator (MMO)	Cordless scanners	Hardware- 3
Senior Production Manager Deli (SPMD)	VOIP	Hardware- 4
Operation Manager Fresh Meat Plant (OMFMP)	The upgraded of scanners (advanced monitors, wireless)	Hardware- 5
Financial Manager (FMW)	Wi-Fi from site to site	Hardware- 6
Process Manager (PM)	Touch screen terminals ASN scanners; the all-in-one tool hat, comes with a monitor and is wireless	Hardware- 7

Participants	Theme: Software	11
Operation Manager Wholesale (OMW)	Meat Matrix (MM) business system with additional model logistics	Software- 1
Stock Control (SC)	Logistics model Sage Pastel	Software- 2
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	The different databases	Software- 3
Senior Production Manager Deli (SPMD)	Different reports specialised	Software- 4
Cost + Management Accounts +Systems (CMAS)	New specialised reports	Software- 5
Procurement Manager Fresh Meat Plant (PMFMP)	The specialises reporting relating to procurement	Software- 6
Operation Manager Fresh Meat Plant (OMFMP)	MM upgrade	Software- 7
Plant Manager Deli (PMD)	Specialised reporting e.g., crystal reporting	Software- 8
Financial Manager (FMW)	Upgrade of hardware/Pastel Evolutions	Software- 9
Process Manager (PM)	Different data bases to get information	Software- 10
Meat Matrix User Operator (MMO)	The use of different reports	Software- 11

The responses were classified as hardware or software and the number of occurrences was determined. Table 20 lists the software and hardware responses.

Table 20: IT investment software and hardware

Software	Hardware
Meat Matrix add-on model	VOIP: The new VOIP system
New Applications (Pastel, tracking, MM)	Scanning tools
Sage Pastel	Label printers
Specialised reports	Wi-Fi from site to site
Stock model Truck tracking system	Network Attached Storage (NAS) drive back up
Intranet	Touch screen terminals ASN scanners; the wireless all-in-one tool with a monitor

The table illustrates some interesting facts about IT investment in the organisation from a software and hardware perspective based on what has been adopted and implemented. It allows comparisons between the software and hardware in assessing the impact IT investment has in the organisation. The bar chart in Figure 16 illustrates the comparison between the software and hardware investments of IT in the organisation.

Software is higher, with a percentage of 61% compared to 39% of hardware investment. The table further revealed that software was specifically implemented to do a specific function e.g., Sage Pastel for accounting and a Tracking model for the tracking of company vehicles. Hardware is generally implemented in relation to a new application on the organisation's already existing network platform on an ad hoc basis.

There seems to be little correlation between software and hardware, as indicated in Figure 16, but there is a stronger link between the number of participants using software and hardware.

The findings provide insights in IT investment in the organisation from software and a hardware perspective. According to Gemalto (2021:3), in an organisation today, software is an important consideration for success as software is crucial to the organisation's performance and revenue opportunities. Gemalto (2021:7) also suggests the benefit to convert from hardware to a business model which is led by software is clear for business efficiency and pricing flexibility, because as Gemalto (2021:7) explains, hardware is more of a stable commodity whereas software is flexible although both are needed by the end user and for the business.

There is substantial investment in software and hardware in this organisation under study. Since software plays an important role in any modern organisation, this organisation is no exception. In general, hardware in the organisation is implemented on an ad hoc basis as decisions get taken from an application point of view: "what the system can do and what the output will be". This is currently the culture and the thinking of top management and all the business units that propose the adoption and implementation of new technology.

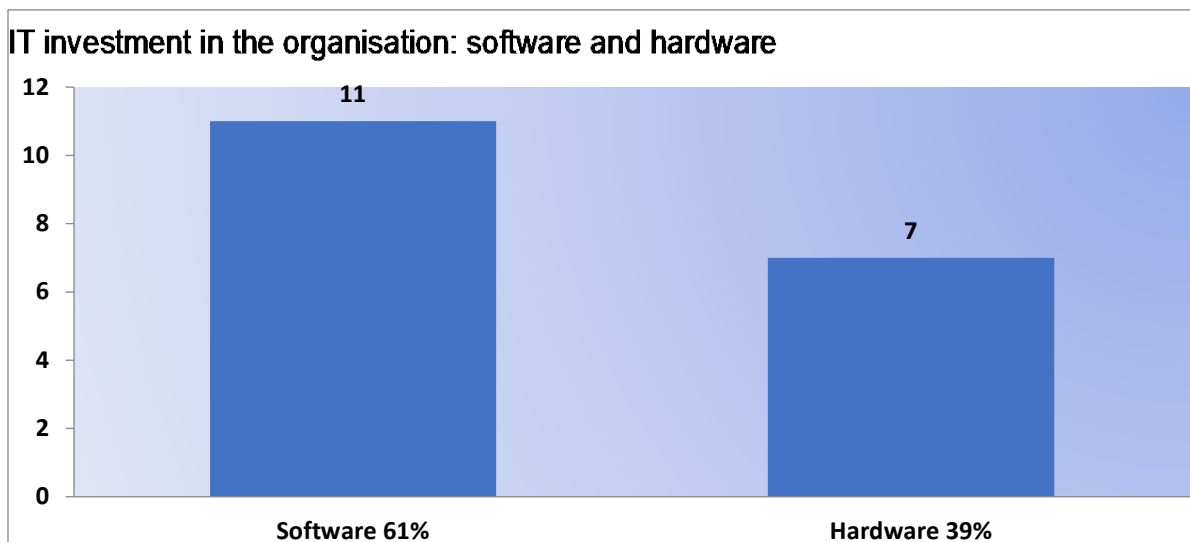


Figure 15: IT Investment in the organisation software and hardware

The finding relating to the kind of IT investment is that software accounts for about 60% of this organisation's IT investment.

4.5.10 IT invested

The tenth interview question was to determine how IT was invested in the organisation.

Table 21: Coding of IT investment aspects based the participant responses

Code Analysis		
Participants	Theme: Adoption was required (tech was a need) (ADOP TECH)	7
Operation Manager Wholesale (OMW)	The increase of production	ADOPTEC-1
Supervisor Wholesale (SW)	Delivery of products increased workload and customers	ADOPTEC-2
Stock Control (SC)	A need was required for a specific task; followed by discussions moving forward until decision was taken to adopt IT to improve the situation	ADOPTEC-3
Cost + Management Accounts +Systems (CMAS)	A need was required mainly in the production area new technology	ADOPTEC-4
Operation Manager Fresh Meat Plant (OMFMP)	The required need is in its business unit implementation of new tech	ADOPTEC-5
Process Manager (PM)	Adoption was required (tech was a need)	ADOPTEC-6
Plant Manager Deli (PMD)	The buy-in by senior management and the participation of all business units affected by the new technology implementation	ADOPTEC-7
Participants	Theme: Part of the strategic decision of the organisation (STRADEC)	8
Operation Manager Wholesale (OMW)	To be more competitive, increase of product diversification	STRADEC-1
Supervisor Wholesale (SW)	It gets decided by top management	STRADEC-2
Stock Control (SC)	Example logistics model moving from a manual model to an IT model	STRADEC-3
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	Experience of an ongoing problem which needs a discussion	STRADEC-4
Cost + Management Accounts +Systems (CMAS)	Part of the strategic decision of the organisation	STRADEC-5
Operation Manager Fresh Meat Plant (OMFMP)	Part of the strategic decision of the organisation	STRADEC-6
Financial Manager (FMW)	Part of the strategic decision of the organisation	STRADEC-7
Process Manager (PM)	CEO strategic decisions	STRADEC-8
Participants	Theme: Buy-in from Top Management (BTM)	10
Operation Manager Wholesale (OMW)	To be more effective; the increase of demand on the business units	BTM-1

Stock Control (SC)	Was involved in the project to customise the logistic model to the organisation	BTM-2
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	Senior management and top management	BTM-3
Meat Matrix User Operator (MMO)	Top managers/senior managers	BTM-4
Senior Production Manager Deli (SPMD)	It was decided by top management and finance and other business units; buy-in to upgrade MM for Deli for the recipe for Deli products	BTM-5
Cost + Management Accounts +Systems (CMAS)	Buy-in from top management; part of the decision-making to invest	BTM-6
Procurement Manager Fresh Meat Plant (PMFMP)	From our senior management as per our discussion	BTM-7
Operation Manager Fresh Meat Plant (OMFMP)	The buy-in from top level management	BTM-8
Financial Manager (FMW)	Buy-in from senior and top management	BTM-9
Process Manager (PM)	Discussion with top management	BTM-10

Three themes were derived and the number of occurrences, as indicated in Table 22.

Table 22: IT invested

IT Investment	Key	N	Percentage
Adoption was required (tech was a need)	ADOPTTEC	7	28
Strategic decision of the organisation	STRADEC	8	32
Buy in from Top Management	BTM	10	40
Total		25	100

From the horizontal bar chart in Figure 4.11, it is evident that 40% of the participants state that buy-in from top management (BTM) for how IT should get invested in the organisation is needed. It also shows that buy-in from top management (BTM) received the highest mentions by the participants. Thirty-two percent (32%) of the participants state that strategic decisions (STRADEC) should form part of how IT is invested in the organisation. And lastly, it is concluded that 28% of the participants are of the opinion that adoption was required as technology is needed (ADOPTTEC).

This study reveals that nearly 50% of the participants responded by indicating the need for buy-in from top management. Al-Subari et al. (2020:3168) point out that an organisation’s success is due to the buy-in from top management as top management normally provides funding through effective communication. As discussed in Chapter 2, technology adoption, according to

Ghobakhloo et al. (2012:3), is the focus of most studies pertaining to influencing factors such as top management, organisational performance, organisational characteristics, suppliers, customers, government, resources, external IT consultant and vendors. Other authors such as Chen and Tsou (2007:1) suggest that an organisation makes substantial investments in IT to align organisational strategies, to allow innovative functional operations and to provide extended organisation networks.

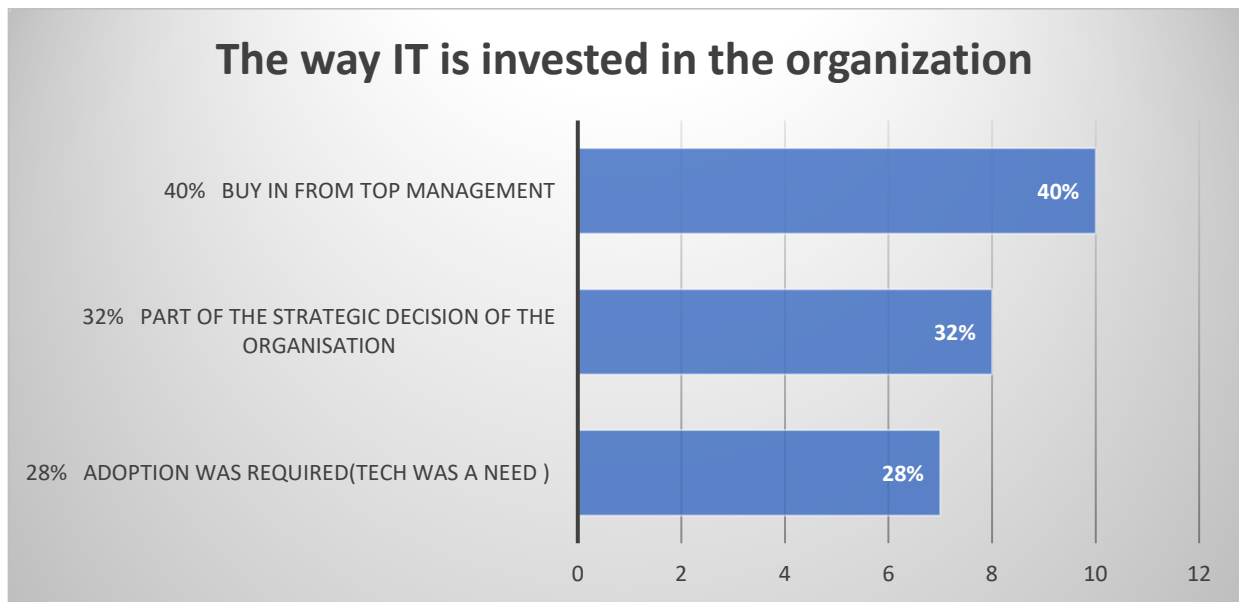


Figure 16: The way IT is invested in the organisation

The finding relating to how IT is invested in the organisation is that it needs buy-in from top management and should be part of the organisational strategy.

4.5.11 IT investment decision-maker

Interview question 11 was posed to the participants to establish who the decision-makers are deciding on IT investments, IT implementation and installation of new equipment and software.

Table 23: Themes for high-level decision-makers based on the codes

Code Analysis		
Participants	Theme: CEO	3
Operation Manager Wholesale (OMW)	Department head will discuss with supervisors; only then a formal request will be forwarded to financial director and CEO	CEO-1
Plant Manager Deli (PMD)	CEO	CEO-2
Process Manager (PM)	CEO	CEO-3

Participants	Theme: CEO and Top Management (CEOTM)	4
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	CEO/TOP	CEOTM-1
Senior Production Manager Deli (SPMD)	Have to do a motivation/presentation which gets submitted to the director; look at the feasibility and make decision; the CEO and senior management top	CEOTM-2
Procurement Manager Fresh Meat Plant (PMFMP)	With senior management; CEO and top management	CEOTM-3
Operation Manager Fresh Meat Plant (OMFMP)	CEO and all the top managers	CEOTM-4
Participants	Theme: Top managers/Senior Managers (TMSM)	4
Meat Matrix User Operator (MMO)	Top managers/senior managers	TMSM-1
Plant Manager Deli (PMD)	CEO, senior management and top management	TMSM-2
Financial Manager (FMW)	Senior and top management and directors	TMSM-3
Process Manager (PM)	Senior management with line managers	TMSM-4
Participants	Theme: Top management (TM)	3
Supervisor Wholesale (SW)	Top management	TM-1
Stock Control (SC)	Top management discussion with financial director with middle management	TM-2
Participants	Theme: Business decision (BD)	4
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	A business decision on who decides	BD-1
Cost + Management Accounts +Systems (CMAS)	The organisation itself, business decision	BD-2
Procurement Manager Fresh Meat Plant (PMFMP)	Group discussion and the participation by all business units	BD-3
Financial Manager (FMW)	Business decides; business units	BD-4

Five themes were derived from the coding process and are presented in Table 24 and Figure 18.

Table 24: Themes of IT investment decision-makers

IT Investment decision-maker	Key	N	Percentage
Chief executive officer	CEO	3	17
Chief executive officer and top Management	CEOTM	4	24
Top managers/Senior Managers	TMSM	4	24
Top management	TM	2	12
Business decision	BD	4	24
Total		17	100

Twenty-four percent (24%) of the participants state that the chief executive officer (CEO) and chief executive officer together with the top Management (CEOTM) are IT investment decision-makers. About a quarter (24%) indicate that top managers and senior managers are decision-takers. In addition, 24% also indicate that it is also a business decision (BD) that determines who decides what IT to invest in. According to the findings, 17% of the participant emphasised that it is the CEO who takes the decisions with regarding IT investment. Twelve percent (12%) of the participants state that only top management (TM) decides what to invest in. As reflected in the graph, this is the lowest percentage of IT investment decision-makers.

The analysis reveals that decision-takers are top managers like the chief executive officer (CEO) and business decisions are the most prominent decisions. This finding resonates with what Sheng and Mykytyn (2002:136) found: that different managers find themselves having to make quick and high-quality business decisions daily, so they require high-quality data in their decision-making process. Shaar et al. (2015:2) explain that top management plays an important role in creating innovations, in providing an organised environment, and in making appropriate decisions to enhance and execute knowledge successfully. Top management helps employees to state their requirements for empowerment, progress personally, accomplish achievement and enhance self-efficacy. According to Lucas et al. (2008), top management has a significant role in any organisation, and so it rests on the contribution of a CEO to strategize IT investment.

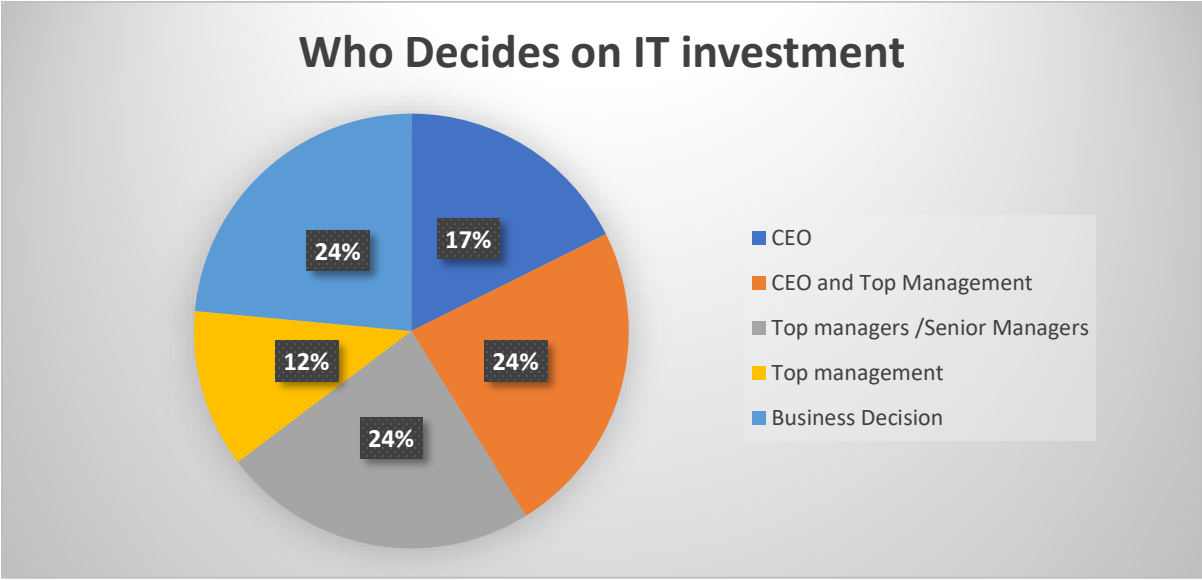


Figure 17: High-level decision-makers

The finding relating to who the high-level decision-makers for IT investments in the organisation are shows that the CEO and top management are the decision-makers.

4.5.12 Decision types

Interview question 12 was to determine what decisions are made about IT investments. The participants' responses with allocated codes appear in Table 25.

Table 25: Type of decision themes

Code Analysis		
Participants	Theme: Programmed decisions (PD)	9
Operation Manager Wholesale (OMW)	Decisions taken regarding issues with ERP for support	PD-1
Supervisor Wholesale (SW)	Everyone can take decisions on a daily basis	PD-2
Stock Control (SC)	Decisions are taken from available data from various data	PD-3
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	Depends on the business units	PD-4
Meat Matrix User Operator (MMO)	In the business environment itself, decisions in business units are work related	PD-5
Operation Manager Fresh Meat Plant (OMFMP)	Daily decisions are taken by different business units	PD-6
Plant Manager Deli (PMD)	Ad hoc decisions relating to problem faced like with systems errors	PD-7
Financial Manager (FMW)	Decisions are taken all the time; ad hoc decisions	PD-8
Process Manager (PM)	Real-time decisions if anyone is facing systems or operational issues	PD-9
Participants	Theme: Routine decisions (RD)	9
Operation Manager Wholesale (OMW)	With IT everyone is empowered to take decisions relating to their work	RD-1
Supervisor Wholesale (SW)	Job output; what is required in the organisation	RD-2
Stock Control (SC)	Dispatching orders for weekends planning	RD-3
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	How tech is used to make decisions	RD-4
Meat Matrix User Operator (MMO)	ERP system errors logged following procedure	RD-5
Senior Production Manager Deli (SPMD)	Ad hoc decisions are taken every day for accuracy and efficiency	RD-6
Cost + Management Accounts +Systems (CMAS)	Depends on the business environment	RD-7
Plant Manager Deli (PMD)	Daily operational decisions are taken daily	RD-8
Process Manager (PM)	Daily decisions depend on business units	RD-9
Participants	Theme: Strategic decisions (SD)	3
Operation Manager Wholesale (OMW)	With the adoption of the logistic model, discussion with higher management	SD-1
Cost + Management Accounts +Systems (CMAS)	Implementation of newly designed reports	SD-2

Plant Manager Deli (PMD)	The adoption of new technology as done in the past for Deli in production area and ERP model upgrade in MM	SD-3
Participants	Theme: Tactical Decisions (TD)	1
Financial Manager (FMW)	Budget yearly for the organisation and planning	TD-1
Participants	Theme: Operational decisions (OD)	1
Financial Manager (FMW)	Decision are taken on pricing; profitability; maintenance; numeration for employees	OP-1

Five themes were derived from the codes and the number of occurrences was allocated.

Table 26: Decision types

Decision types	Key	N	Percentage
Programmed decisions	PD	9	39
Routine decisions	RD	9	39
Strategic decisions	SD	3	13
Tactical Decisions	TD	1	4
Operational decisions	OP	1	4
Total		23	100

The horizontal bar in Figure 4.13 illustrates the decisions taken in the organisation in relation to IT investment in the organisation. The data are given as percentages in the table. Overall, there was a wide spread of decision types. The figure presents five themes mentioned by the participants from the different business units; answers are indicated in Appendix L Data Analysis coding: PD, RD, SD, TD and OP.

The data refers to the participants’ responses to the question: “What decisions are taken in the organisation?” Overall, a similar percentage of decision types are shown on the bar figure. The percentages of PD and RD themes are 39% respectively. These two themes are the highest as mentioned by the participants from different business units. On the other hand, the decision types of TD an OP are only 4% respectively – the lowest, as indicated in Figure 19. And finally, 13% of the participants stated that SD forms part of what decisions are taken in the organisation in regard to IT investment in the organisation.

According to the findings as shown in Figure 4.13, routine and programmed decisions are the highest, respectively. As described by Bohanec (2009:25), routine decisions are taken often and repeatedly. In this decision type, the decision-maker is normally familiar with the problem.

Bohanec (2009:27) comments that tactical decisions affect the organisation for a limited time into the future. Typically, tactical decisions are made by middle management and take place in the framework of early strategic decisions. According to Bohanec (2009:27), operational decisions affect only existing activities in an organisation; these decisions have limited influence for a short period of time. Operational decisions are normally made by non-managerial personnel or lower-level managers.

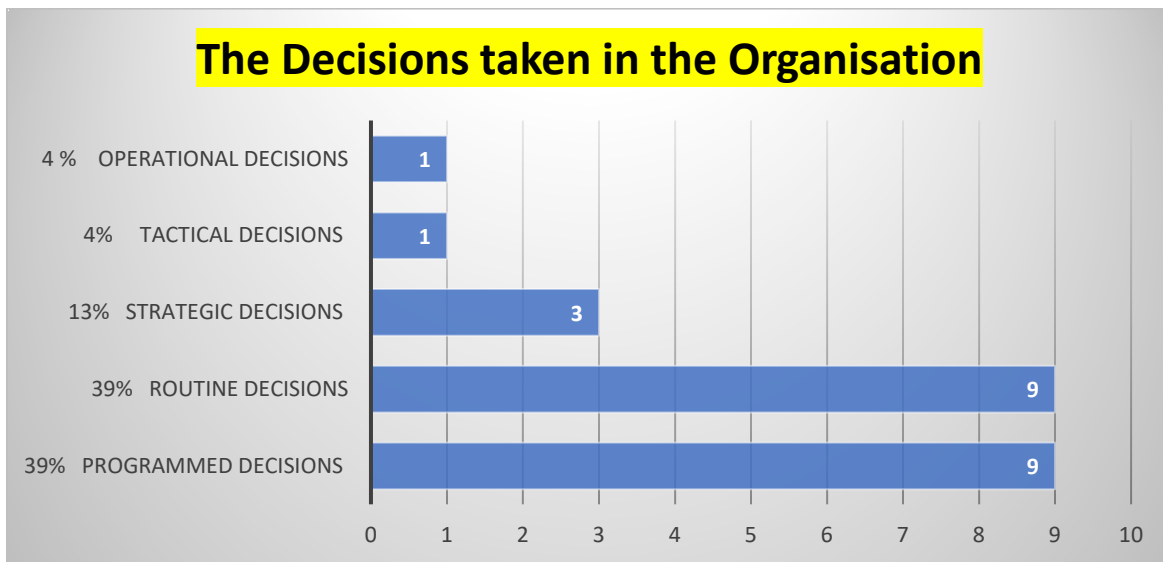


Figure 18: Type of decisions taken in the organisation

The finding relating to the type of decisions made for IT investments is that such decisions are mostly routine and regularly programmed decisions.

4.5.13 Decision taker

Interview question 13 was posed to establish who from the business units take decisions regarding IT tools currently used in the environment before the decision is escalated to a higher level.

Table 27: Business units decision-maker themes

Code Analysis		
Participants	Theme: Group decision as a business unit (GDBU)	4
Operation Manager Wholesale (OMW)	As a business unit we decide what is required and the analysis to be done	GDBU-1
Supervisor Wholesale (SW)	Decide together	GDBU-2
Meat Matrix User Operator (MMO)	Management in the business unit for production-related issues	GDBU-3

Senior Production Manager Deli (SPMD)	The norm is have a group meeting from all the areas e.g., plant manager, operation Admin	GDBU-4
Participants	Theme: Strategic decision by Director/Owners (SDDO)	7
Operation Manager Wholesale (OMW)	New development in organisation	SDDO-1
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	New equipment for production by top management	SDDO-2
Cost + Management Accounts +Systems (CMAS)	Role players in the different business units	SDDO-3
Plant Manager Deli (PMD)	Adoption of new machine IT	SDDO-4
Financial Manager (FMW)	Any capital investment by senior management	SDDO-5
Process Manager (PM)	Hardware-related IT in business	SDDO-6
Meat Matrix User Operator (MMO)		SDDO-7
Participants	Theme: Operator/Supervisor general decision from ERP system (GD)	9
Operation Manager Wholesale (OMW)	Everyone takes decisions in the organisation	GD-1
Stock Control (SC)	Everyone in the organisation takes decisions; depends on current situation from its own business units	GD-2
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	Senior production management/QA managers /senior operation managers in in the production relating to product	GD-3
Meat Matrix User Operator (MMO)	Meat matrix decisions	GD-4
Procurement Manager Fresh Meat Plant (PMFMP)	Everyone in the organisation, related to meat matrix	GD-5
Operation Manager Fresh Meat Plant (OMFMP)	Everyone take decisions, depends on the situation ERP system	GD-6
Plant Manager Deli (PMD)	Everyone in the organisation who are affected with related/ERP system	GD-7
Financial Manager (FMW)	The dedicated individual responsible for its business unit	GD-8
Process Manager (PM)	Everyone is authorised in relation to the work output	GD-9
Participants	Theme: Top Management TM	4
Operation Manager Wholesale (OMW)	New product development	TM-1
Senior Production Manager Deli (SPMD)	This is a process	TM-2
Plant Manager Deli (PMD)	Upgrade of ERP certain function	TM-3
Financial Manager (FMW)	All in the organisation; depends on the level of the business unit; daily accounts issues	TM-4
Participants	Theme: CEO and directors (CD)	5
Wholesale (SW)	New software for business	CD-1
Stock Control (SC)	ERP system new module adopt	CD-2

Senior Production Manager Deli (SPMD)	Adoption of the new software for cookers	CD-3
Cost + Management Accounts +Systems (CMAS)	Creation of new reports	CD-4
Procurement Manager Fresh Meat Plant (PMFMP)	New scanners implemented; top managers; senior management; supervisors	CD-5

Five themes were derived from the coding process and the number of occurrences was calculated, as indicated in Table 28.

Table 28: Business units decision-maker

Decision taker	Key	N	Percentage
Group decision as a business unit	GDBU	4	14
Strategic decision director/owners	SDDO	7	24
Operator/supervisor general decision from ERP system	GD	9	31
Top Management	TM	4	14
CEO and directors	CD	5	17
Total		29	100

Thirty-one percent (31%) of the participants indicate that the operator or supervisor takes the general decisions from the ERP system. As indicated in the bar graph, the themes are stated as GDBU and TM at 14% respectively. Twenty-four percent (24%) of participants indicate that strategic decisions are taken by the director or owners. Seventeen percent (17%) of the participants indicate that the CEO and directors take decisions with regard to the IT investment in the organisation. Fourteen percent (14%) of the participants indicate that top management take the decisions with regard to IT investment.

As discussed in Chapter 2, this is consistent with the findings of the literature review; Lucas et al. (2008) explain that top management plays a significant role in any organisation. The contribution by the CEO is to strategize IT investment successfully. From IT investment (IT/IS), it is indicated by most CEOs that 50% of companies outsource their IT services which benefits the organisation indirectly by saving costs. According to Al-Subari et al. (2020:3), several past studies have emphasised the success of organisations due to the effectiveness of top management support.

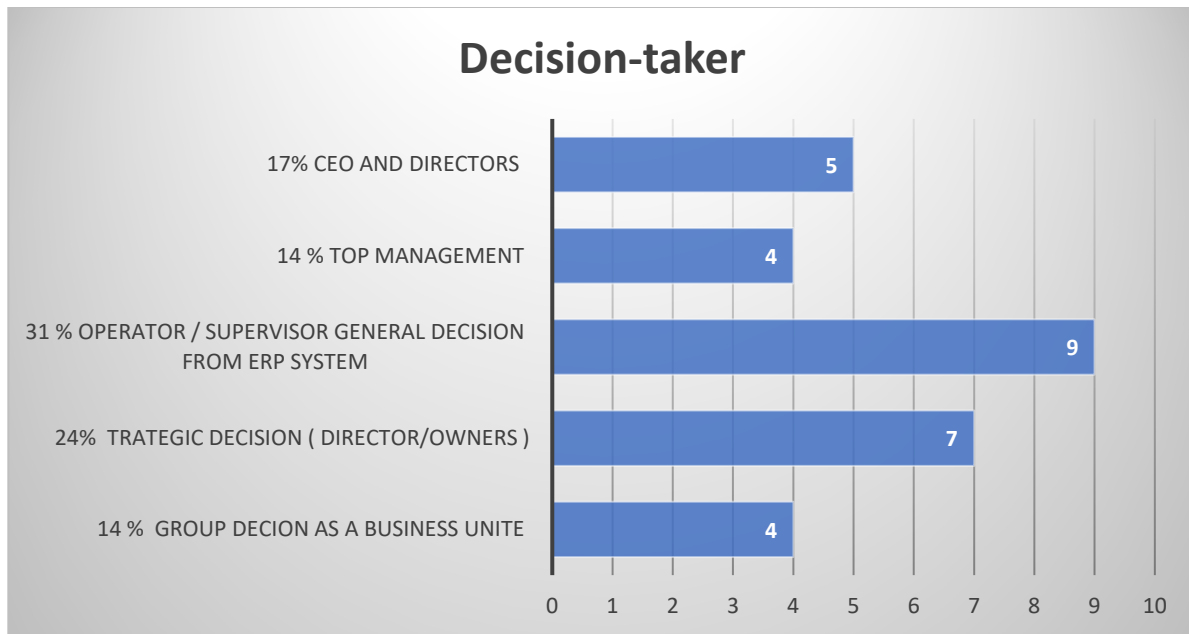


Figure 19: Decision taker

The finding relating to who in the business units takes decisions about IT investment is that it is the operator and supervisor for ERP system decisions, but strategic decisions are taken by the director/owners.

4.5.14 How decisions are taken

Interview question 14 was posed to the participants to determine how decisions are taken in the organisation. The responses according to themes with the number of occurrences for each appear in Table 29.

Table 29: Decision taking approaches

Code Analysis		
Participants	Theme: Decisions taken as a business unit relating to what is required (DT)	6
Senior Production Manager Deli (SPMD)	Everyone in the organisation; managers	DT-1
Cost + Management Accounts +Systems (CMAS)	Discussing with senior management for buy-in	DT-2
Procurement Manager Fresh Meat Plant (PMFMP)	In a forum, everyone together discussion with managers	DT-3
Operation Manager Fresh Meat Plant (OMFMP)	All decisions are taken in a group meeting from different business units	DT-4
Financial Manager (FMW)	Depends on the request (need to be authorised by senior management)	DT-5
Process Manager (PM)	Have a meeting with all business units; depends on what is required and what	DT-6

	decisions are to be taken e.g., changes in the production environment	
Participants	Theme: The need to be identified depends on situation (DOS)	6
Senior Production Manager Deli (SPMD)	Depends on the problem confronted with	DOS-1
Operation Manager Wholesale (OMW)	Depends on the circumstances	DOS-2
Stock Control (SC)	Depends on the situation; individually what is required as output	DOS-3
Cost + Management Accounts + Systems (CMAS)	The need to be identified depends on situation	DOS-4
Plant Manager Deli (PMD)	Forum, e.g., management and subject matter of problem	DOS-5
Financial Manager (FMW)	To establish what is required (a need is to be identified)	DOS-6
Participants	Theme: Decision taken must follow the standard procedure (DSP)	3
Supervisor Wholesale (SW)	It is a process. e.g., if the problem arises, meeting between operation and business units and IT and Finance	DSP-1
Meat Matrix User Operator (MMO)	Decision taken must follow the standard procedure	DSP-2
Senior Production Manager Deli (SPMD)	Decision taken must follow the standard procedure	DSP-3

Three themes were derived from the coding process

Table 30: How decisions are taken

How are decisions taken	Key	N	Percentage
Decisions taken as a business unit relating to what is required	DT	6	40
The need to be identified depends on situation	DOS	6	40
Decision taken must follow the standard procedure	DSP	3	20
Total		15	100

This doughnut graph in Figure 21 shows examples of how decisions are taken with IT investment in the organisation.

Forty percent (40%) of the participants indicate that decisions are taken as a business unit relating to what is required (DT) and also based on the need identified, as need depends on the situation (DOS). These two themes received the highest number of mentions by the participants from different business units. Twenty percent (20%) of the participants indicate that decisions taken must follow a standard procedure (DSP).

According to the findings and analysis, decisions are taken as a business unit and depends on the situation and what is required. As discussed in Chapter 2, this is consistent with the findings from literature that decisions are taken based on the availability of quality data (Neziraj & Shaqiri, 2018). According to Meiryani et al. (2020:320), the decision-maker has to follow specific procedures when taking a decision. The decision-making process consists of the following stages: the identification of the problem; the consideration of the best alternatives; and the choosing of the best decision.

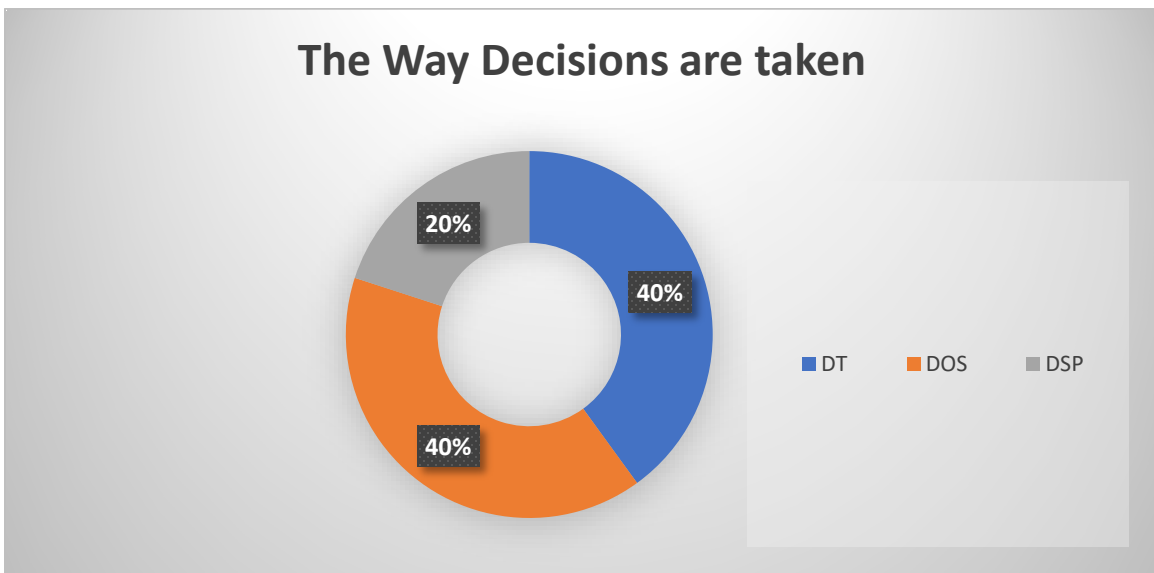


Figure 20: How decisions are taken

The finding relating to how decisions are taken is that business units take their own decisions that depend on the particular situation.

4.5.15 Decision-maker experiences

The interview question to determine the decision-makers' experiences using IT investments in the organisation is as follows: What is the experience of the decision-makers in using the IT investment in the organisation?

Table 31: Codes based on the participant responses

Code Analysis		
Participant	Theme: More streamlined (MS)	6
Operation Manager Wholesale (OMW)	More organised	MS-1
Stock Control (SC)	More streamlined	MS-2

Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	The factory operates better	MS-3
Senior Production Manager Deli (SPMD)	The environment is much more organised	MS-4
Financial Manager (FMW)	It simplifies the process	MS-5
Process Manager (PM)	Testing first in the QA environment; signing off before it is implemented in the live environment	MS-6
Participant	Theme: Profitable (PROF-1)	4
Operation Manager Wholesale (OMW)	As a logistics and operation manager, it definitely impacts the performance and productivity in these areas	PROF-1
Supervisor Wholesale (SW)	Affects productivity positively	PROF-2
Stock Control (SC)	Profitable	PROF-3
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	Save on wastage	PROF-4
Participant	Theme: Cut on labour cost (COLC)	4
Stock Control (SC)	Cut on labour cost	COLC-1
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	It improves production	COLC-1
Senior Production Manager Deli (SPMD)	Planning labour required in production	COLC-1
Operation Manager Fresh Meat Plant (OMFMP)	Planned staff beforehand	COLC-1
Participant	Theme: Approaches to doing things are different (AODD)	3
Supervisor Wholesale (SW)	Improves operation	AODD-1
Cost + Management Accounts +Systems (CMAS)	Should be part of the strategic strategy of the organisation	AODD-2
Process Manager (PM)	Does a costing in production; will do comparison of costing before signing off	AODD-3
Participant	Theme: More competitive	6
Operation Manager Wholesale (OMW)	As the environment we operate is becoming very competitive	MC-1
Supervisor Wholesale (SW)	Increases competitiveness	MC-2
Procurement Manager Fresh Meat Plant (PMFMP)	Performance	MC-3
Stock Control (SC)	Improves production output and performance	MC-4
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	With tech, we are more competitive	MC-5
Senior Production Manager Deli (SPMD)	Quick real-time efficiently	MC-6
Participant	Theme: Skill for top to semi-skilled management (STSM)	1
Plant Manager Deli (PMD)	Various levels of skill for top to semi-skilled management	STSM
Participant	Theme: Consistency	2

Operation Manager Wholesale (OMW)	Always, if following the same method	STSM-1
Financial Manager (FMW)	With Pastel software every month	STSM-2
Participant	Theme: Confident in making decision/easiness (CDE)	5
Operation Manager Wholesale (OMW)	How activities in the organisation were done before; how they get done now after IT investment	CDE -1
Supervisor Wholesale (SW)	Increase efficiently	CDE -2
Senior Production Manager Deli (SPMD)	Available information makes decisions easy	CDE -3
Operation Manager Fresh Meat Plant (OMFMP)	E.g. product expired; the system will notify the business if product expires or not for new production	CDE -4
Financial Manager (FMW)	Using real-time data to make accurate decisions	CDE -5
Participant	Theme: Strategy should be part of the organisation(STR)	4
Operation Manager Wholesale (OMW)	Part of the organisation objective long-term	STR-1
Senior Production Manager Fresh Meat Plant (SPM Fresh Meat Plant)	Strategic decisions should be part the organisation	STR-2
Procurement Manager Fresh Meat Plant (PMFMP)	Mostly by top management; part of the strategic decisions	STR-3
Operation Manager Fresh Meat Plant (OMFMP)	Long-term planning in organisational investment	STR-4

Nine themes were derived from the coding process and the number of occurrences calculated.

Table 32: Decision-maker experiences themes

Decision-maker experiences	Key	N	Percentage
More streamlines	MS	6	17
Profitable	PROF	4	11
Cut on labour costs	COLC	4	11
Approaches to doing things are different	AODD	3	9
More competitive	MC	6	17
Various level of skill for top to semi-skilled management	STSM	1	3
Consistency	Consistency	2	6
Confident in making decision/easiness	CDE	5	14
Strategy should be part of the organisation	STR	4	11
Total		35	100

The horizontal bar chart in Figure 4.16 illustrates the participants' experiences in relation to the experience of the decision-makers in using the IT investment in the organisation.

Being more competitive and streamlined were indicated as the experiences of using IT investments by most participants (17%). The experience indicated as the second most (by 14%) is being confident in making decisions and easiness to take decisions. Thirdly, the following experiences are indicated (11%): being profitable, cutting labour costs, and IT investment strategy as part of the organisation. Nine percent (9%) of the participants indicate that their decision-making experience is based on the ability to approach doing things differently. As revealed in Table 4.15, only 3% of the participants state that special skills for top management and semi-skilled management (STSM) are required; while 6% of the participants indicate that they experience consistency in decision-making.

These findings are comparable to findings from literature. According to Bhatt and Grover (2005:8), the experience of using IT allows an organisation to integrate IT strategy more easily with organisational strategy, thereby creating a reliable and cost-effective system for the organisation to get ahead of its competitors. Bhatt and Grover (2005:8) also mention that an organisation has a competitive advantage at large because of the organisation's top management, technical skills and organisational judgement.

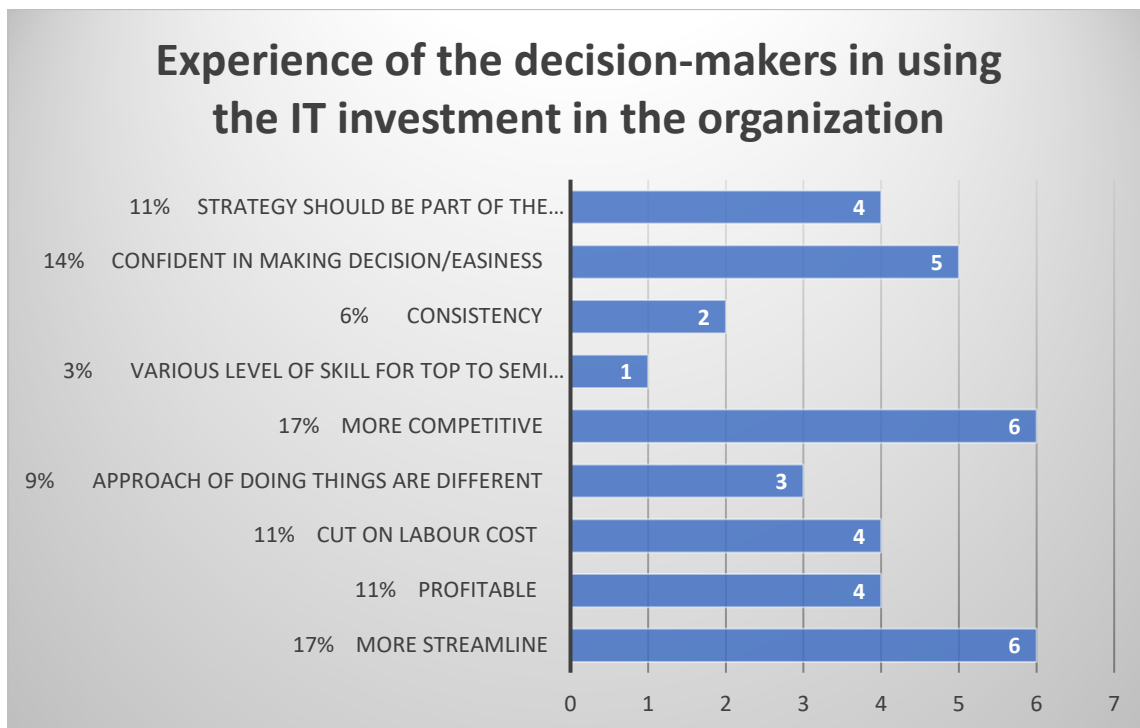


Figure 21: Decision-maker experiences

The finding relating to the experiences of the decision-makers is that it makes the business more competitive and streamlined as well as bolstering confidence in making decisions.

4.6 Chapter summary

This chapter consists of findings, data analysis and interpretation of data. Findings of the semi-structured interviews were collected from 12 participants. Data were analysed according to the research questions posed earlier in the study. From the semi-structured interviews, findings were further analysed into themes and grouped together, as indicated Appendices A-O. Findings were then converted into percentages and collated in the form of tables, graphs and figures to make the data presentation meaningful.

CHAPTER 5: DISCUSSION & RECOMMENDATIONS

5.1 Introduction

This chapter entails the introduction follow by a summary of the findings and a discussion.

5.2 Summary of key findings

A summary of the key findings derived in Chapter 4 appears below.

Table 33: Summary of the key findings

No	Key findings
1	IT supports decisions based on real-time data as it supports communication.
3	IT investment influences decisions with the availability of real-time data to assist with forecasting.
2	IT benefits the organisation with planning, productivity, performance and improved efficiency.
4	Examples of how IT investments benefit decision-making are predominantly to support decisions for new applications and software.
5	The challenges experienced with IT investment are system errors, lack of skills and slow uptakes and updates.
6	The influence of the challenges on decision-making relates mainly to hardware errors, databases, data and scanner problems as well as ERP system errors.
7	The challenge with IT investment on decision-making is mostly for ERP support.
8	Suggestions for good IT investments are to consider the adoption of new hardware/network architecture improved/database, and the implementation of new software.
9	The best kind of IT investment is that software should account for about 60% of the investment.
11	High-level decision-makers for IT investments in the organisation are the CEO and top management.
12	The types of decisions made for IT investments are decisions are that mostly routine and programmed.
10	IT invested in the organisation needs buy-in from top management and should be part of the organisational strategy.
13	The business units taking decisions about IT investment are the operator and supervisor for ERP system decisions and for strategic decisions, the director/owner should take such decisions.
14	Decisions taken by business units are their own decisions that depend on the particular situation.
15	The experiences of the decision-makers are that IT investments make the business more competitive and streamlined as well as give them more confidence in making decisions.

The key findings were organised into five themes, as indicated below.

Table 34: Key findings according to the identified themes

No	Key findings	Key themes
1	IT supports decisions based on real-time data as it supports communication.	T1
3	IT investment influences decisions with the availability of real-time data to assist with forecasting.	T1
2	IT benefits the organisation with planning, productivity, performance and improved efficiency.	T2
4	Examples of how IT investment benefits decision-making are predominantly to support decisions for new applications and software.	T2
5	The challenges experienced with the IT investment are system errors, lack of skills, and slow uptakes and updates.	T3
6	The influence of the challenges on decision-making relates mostly to hardware errors, database, data and scanner problems as well as ERP system errors.	T3
7	The challenges with IT investment on decision-making are mostly for ERP support.	T3
8	Suggestions for good IT investments are to consider the adoption of new hardware/network architecture improved/database, and the implementation of new software	T4
9	The kind of IT investment is that software should account for about 60% of IT investment.	T4
11	High-level decision-makers for IT investments in the organisation are the CEO and top management.	T4
12	The types of decisions made for IT investments are decisions that are mostly routine and programmed.	T4
10	IT invested in the organisation needs buy-in from top management and should be part of the organisational strategy.	T5
13	The business units taking decisions about IT investment are the operator and supervisor for ERP system decisions, and for strategic decisions, the director/owner should take such decisions.	T5
14	Decisions taken by business units are their own decisions that depend on the situation.	T5
15	The experiences of the decision-makers are that IT investments make the business more competitive and streamlined as well as give them more confidence in making decisions.	T5

A summary of the themes appear in the table below.

Table 35: Summary of the five themes

No	Theme
T1	Support and decisions of information technology investment
T2	IT investment benefits for the organisation
T3	Challenges of IT investment to influence decisions
T4	IT investment for decision-making in the organisation
T5	The decision-maker and the decision-making process of IT investment

5.3 Discussion

The findings grouped into the themes are discussed next.

5.3.1 Support and decisions of information technology investment

How IT supports decisions in the organisation is highlighted in the study. The findings validate the role of real-time data in supporting decisions in the organisation. From the interviews, it follows that the organisation agrees that the availability of various reports from different databases benefit the organisation by improve planning, forecasting and in the long run, improving performance. It is evident from the interviews that IT investment effects the accuracy and efficiency of work performed in the organisation. The study found an increased flexibility in how IT is used to make decisions. Drawing from the literature and analysis, results show that a large percentage of the interviewees in the organisation agreed: IT enables an organisation to operate efficiently and profitably. As emphasised in the literature review, Nikoloski (2014:303) points out that IT plays a key role in automating simple, tedious tasks such as Word processing and advanced processes such as production, scheduling and logistics. Therefore, IT enables an organisation to operate efficiently and profitably. The findings also confirm the implementation of technology such as Wi-Fi and VOIP to make communication more flexible and cost effective. Nikoloski (2014:303) explains that IT includes the management information systems (MIS), computers, hardware, software and networks used to automate and support organisational tasks and decision-making.

The findings confirm use of real-time data to enhance the integrity of data to make decisions. From the findings of the interviews, it is revealed that the more the technology is used in the organisation, the greater the reliance and dependency on it. The literature indicates, according to Sheng and Mykytyn (2002:136), that different managers need to make quick and high-quality business decisions every day, and therefore the managers in the business environment need high-quality data in their decision-making process. The study determined the following based on the efficiency of work performed: The use of new technology – e.g., scanning tool (to improve stock taking); group chat WhatsApp technology (to deal with queries immediate); using specialised software and technology hardware (to determine weight loss of meat products while delivering the product) – is important for product pricing and the proper scheduling of the delivery truck for mornings and afternoon routes.

Recommendation

It is recommended that the organisation take advantage of already good decision-making practices and focus on investing in IT to be more competitive with its market environment.

5.3.2 How does IT investment benefit the organisation?

Our findings various benefits relating to the question of IT benefits in an organisation. The findings indicate that investment in IT contributes directly to its benefits. From the literature review, Liu and Chen (2004:3), considering IT from an organisational perspective, find that IT improves efficiency and effectiveness of an organisation by reducing the bounded rationality of decision-making. It is evident from the interviews that IT investments benefit by contributing to the elimination of manual intervention thereby preventing mistakes of human error. Participants admit that IT investment improves how things get done in the organisation, with the advantage of doing things better and being more flexible. Drawing from the literature on the flexibility and how this improves operations, particularly from Shoji (2022), we know that in many ways technology has forced many organisations to remain flexible, adapting their operations to newer and better technological advances. Thus, by using new tech-tools, organisations and employees enjoy a number of business-related benefits. The findings reflect that with an increase in productivity there is more accuracy, fewer errors and more efficiency in organisational performance. It was found that IT investment leads to improvement in decision-making in this organisation under study.

The interviews show that a high percentage of participants base their decision on using new applications and newly adopted software to improve workflow. The findings also confirm the high use of specialised reports. In addition to the business system, a logistics model creates the following three advantages: it improves the process flow from picking (creating and ordering) to moving stock to an external customer; it works out the cost to determine the profit by using the ERP cost system; and it verifies the picking and ordering. Our findings show that most of the participants in the organisation agree that the new software adopted improved workflow and when drawing up budget and extracting information from reports, the information presented in the budget is accurate. The literature review in Chapter 2 has presented an example of how IT investment benefits an organisation. It is shown that many organisations have used software, different types of advanced applications, computers and the Internet to transform their organisation from local places of business to national and even global market competitors (Shoji,

2022). The finding of this study has confirmed decisions which are based on using the newly adopted applications. One benefit, for example, is the availability of data.

Recommendation

From the above discussion of how IT investments benefit the organisation, findings demonstrate the myriad ways that investment in IT benefits the organisation. The recommendation is to use the various benefits to the organisation's advantage.

5.3.3 Challenges of IT investment to influence decisions

According to the interview responses, certain challenges such as system errors can only be solve by outside consultants. This challenge is in line with what most authors explored in the literature review have identified as an obstacle since it requires specialised skills to address and rectify. According to Ghobakhloo et al. (2011:67), a small organisation does not have the necessary specialised expertise and skills to support specialised software or applications. They further point out that advanced technology requires the engagement of consultants to support specialised applications and again, this is not always possible with a small business.

An important finding is the challenge relating to hardware-related errors that resonates with the literature findings (Ghobakhloo et al., 2011). Another finding indicates that the enterprise resource planning (ERP) shows system errors which can only be solved by outside consultants.

The participants indicate that they are experiencing skill issues to operate the business system. The technology acceptance model of information shows that only a few participants having the right skills are accepting of technology in the organisation (Wu & Chec, 2017).

Similar to the challenges as discussed above, this study found intermittent IT errors, freezing and slowness of the hardware and network-related issues. Participants indicated the need for ongoing support as IT depended on specialised external upkeep.

5.3.3.1 Recommendations

Although IT is one of the functional aspects in the organisation, it is recommended that more emphasis be given to this functional area. Having invested in so much technology, these hazards may have a negative effect on the organisation. System errors currently experienced in the organisation are dependent on outside consultants to be fixed. This should form part of the strategic planning in future to have a highly specialised permanent person on site who can support and liaise with the owners of the current ERP system. This will ease the time taken to fix errors

and will also, in return, save on cost. It is further suggested from a skill perspective to have someone with the skills to operate the ERP system. Specialised training should be given to those individuals who require training. The findings have shown that training is requiring although it is not critical at this stage.

5.3.4 Investment for decision-making in the organisation

The study found three significant points from a hardware perspective of how IT investment for decision-making suggestions affect the organisation: the adoption of new hardware, network architecture improvements and the implementation of new databases. The findings of this study further described a similar type of scenario from a software perspective in relation to the implementation of new software. It is evident from the interviews that the implementation of the Track Scale in the organisation benefits the organisation by saving time and costs. The interviews confirm the most important software implementation is the different reports and the special business intelligent report that have an impact on IT investment for decision-making. The finding from all the interviews is the implementation and upgrade of the communication tools such as VOIP and Wi-Fi. These have certainly positively impacted IT investment for decision-making (Grant, 2016). This is consistent with the literature that IT is a good investment for decision-making in the organisation.

In the contemporary world, the two most important technology components that drive a business are hardware and software. Findings from the interviews clearly showed that software plays an important role in decisions as the success of the organisation depends on software. The findings revealed that the adoption of software applications seems to be the highest priority. According to Gemalto, (2021:3), in an organisation today, software is the pinnacle for business success as software is crucial to organisational performance and revenue opportunities. The user does not see the importance of the hardware which drives the application behind the scenes. The interviews show that the hardware that was implemented was generally from a communication point of view. Drawing from the literature, Gemalto (2021:7) states that hardware is used more as a commodity whereas software is more flexible. However, both are needed for end users and for the business.

In Chapter 2, the review of previous studies shows that the existence of top management in an organisation is important, in particular when it comes to the investment of technology. The findings of this study validate the significant role the top management plays when IT is invested in the organisation. This study reveals that nearly half of the participants responded by stating the

importance of buy-in from top management. As the literature indicates and Al-Subari et al. (2020:3168) confirms, organisational success is due to buy-in from top management. In terms of the awareness of the adoption of new technology, which is vital, findings show that a substantial number of participants responded in favour. It is evident from the interviews that strategic decisions of the organisation, as pointed out by the participants, should form part of how IT gets invested in the organisation. Chen and Tsou, (2007:1) point out that an organisation making substantial investments in IT to align organisation strategies will have innovative functional operations and extended organisation networks.

Recommendations

As highlighted in the findings, a significant capacity of software and hardware was invested in the organisation. Since software plays an important role in any modern organisation, this organisation is no exception. Currently, all hardware in the organisation gets implemented on an ad hoc basis as decisions get taken from an application point of view: “what the system can do and what the output will be”. This is currently the culture and the thinking of top management and all the business units who propose the adoption and implementation of new technology. No analysis is undertaken before the decisions are taken on new applications. It is suggested that more emphasis should be given to the network platform and architecture before any decisions are made on any new applications in the future.

5.3.5 The decision-maker and decision-making process of IT investments

The findings indicate that four decision-makers play an important role during the decision-making process. These roles are the CEO, top management, senior management and business unit managers. This finding agrees with the literature as to the top management and CEO primarily taking IT decisions in an organisation (Lucas et al., 2008). Top management plays a significant role in any organisation with the CEO taking strategic decisions regarding investment in IT. From an IT investment point of view, it was indicated that 50% of companies outsource their IT services; this benefits the organisation indirectly by saving costs.

The participant interviews revealed that routine and programmed decisions are the primary decisions of users in the organisation. Many participants further described their decisions as ad hoc decisions depending on the problem they are facing, such as system errors. The participants also mentioned that decisions are taken from data available from various databases. Some of the findings show that decisions are taken regarding issues with ERP for support. As described by

Bohanec (2009:25), routine decisions are taken often and repeatedly. The findings indicate that the most common types of decisions are routine, e.g., where everyone takes decisions based on their daily work practices.

The findings from the interviews are that top management play a significant role in the development of new products and the upgrade of the ERP system based on the functionality needed. According to Lucas et al. (2008), the function of top management under the leadership of the CEO is to take decisions about IT investment aligned to the organisation's strategies.

Decisions are taken during meetings with all business units that depend on the present requirements, e.g., changes in the production environment. Decisions are also taken as a group of different business units. In some cases, proposed IT investments are presented at the meeting to generate buy-in of the decision-makers and such cases depend on specific situations. Findings in the literature indicate that the quality of decisions is based on the quality of the data supporting the decision (Neziraj & Shaqiri, 2018:14). According to Meiryani et al. (2020:320), the decision-maker has to follow specific processes based on the identified problem and the consideration of alternative solutions in order to decide on the best situation.

All the participants indicated that their experiences of using IT investments are an important factor that allows the decision-makers to decide about further IT investments to streamline the organisation and improve decision-taking. Many of the participants also indicated that according to their experience, IT investments often reduce labour costs. Their experiences also improve the consistency in decision-making. Drawing from the literature, Bhatt and Grover (2005:8) insist that an organisation's competitive advantage depends on the organisation's top management, technical skills and organisational judgement. They also point out that the experiences of using IT investments allows the organisation to easily integrate IT and organisational strategies, thereby creating a reliable and cost-effective system for the organisation and getting ahead of their competitors.

Recommendation:

All decisions should follow a uniform procedure across all business units based on employee experiences with the IT investments in practice.

5.4 Conclusion

This case study has determined and established the issues of the impact of IT investment on decision-making in an organisation. The findings show that investment in IT plays a significant

role in decision-making. The participants acknowledged the importance of technology. As to the participants who were interviewed across all business units in the organisation, they believe that certain tasks require specialised skills to perform. It is further emphasised that decisions taken from real-time data could have serious consequences should data be used wrongly. Moreover, the findings have revealed that there is an ad hoc implementation of hardware in the organisation. It is concluded that the implementation of new hardware should form part of the strategic decisions. The weakness is that there is no specialised IT technologist on site on a permanent basis.

CHAPTER 6: CONCLUSIONS & FURTHER RESEARCH

6.1 Introduction

This is the concluding chapter of the thesis where the research questions are answered to address the identified research gap. This is followed by reflections, contributions and the conclusion.

6.2 Overview of research conducted

The research was guided by the research questions using a case study strategy to collect and analyse the qualitative data. The thesis structure provides the reader with an idea of the thinking process of the researcher. The research gap was identified from recent literature that was formulated as the research problem. The research aim and questions were formulated to address the identified research problem. The research design was informed by the nature of the research problem and a single case was identified for the research strategy.

The theoretical framework adapted for the study was used to guide the literature review, data collection and data analysis. Data was collected with semi-structured interviews with 12 participants and analysed by a thematic analysis process. The findings were derived and interpreted to formulate answers to the research questions.

6.3 Research questions revisited

From the key findings, we have grouped the two sub-research questions answers first before answering the main research question.

6.3.1 How does investment in IT affect decisions in the organisation?

As revealed in the findings, it is clear how IT supports decisions and makes information available to improve the quality and speed of decision-making. The study has identified that real-time data plays a strategic and important role in supporting decisions. Further, the study has found that IT improves the efficiency and effectiveness of an organisation by reducing the bounded rationality of decision-making. This research has shown that by using tech-tools, organisations and employees enjoy a number of business-related benefits. Thus, it is important that investment has proven that flexibility has a direct influence on IT investment decisions, and that in the future more participants could be using real-time data availability/integrity and forecasting in their respective business units to influence their decisions. These managers are highly dependent on the required information as they find themselves having to make quick and high-quality business decisions every day, and thus in need of high-quality data in their decision-making process on which to base

their decision, often by using new applications and new software to improve workflow. Moreover, participants responded that using specialised reports affects how decisions are taken on a daily basis.

Per the findings, there is an indication that IT investment benefits decisions in the organisation where to the innovation of a product or service targeted a market need. The challenges faced concern system errors with IT investment, and many of these system errors can only be solved by outside consultants. The organisation admits that it is important to have specialised expertise and skill to support specialised software. Advanced technology requires the engagement of consultants to support specialised applications; often this is not possible with small businesses. Certainly, the organisation is highly dependent on the current business system (ERP). Only a small percentage of the participants have skill for operating the system. Moreover, as a challenge which influences decisions, the interviewees pointed out the example of Meat Matrix (MM). The findings indicate the system needs ongoing support as it relies on specialised external upkeep. In addition to this challenge, there are ongoing intermittent hardware-related issues which are also example of challenges which influence decisions. Lastly, IT investment for decision-making points to the adoption of hardware and the implementation of software. It furthermore points out the necessary upgrade of the ERP system.

The research objective was to determine how IT investments influence decision-makers in an organisation. Based on the above discussion it is clear that IT investments play a role in decision-making. Challenges were identified that could be considered by the management to better utilise their IT investments.

6.3.2 What IT investments enable decision-making in an organisation?

The study has revealed that IT investments, such as the implementation and adoption of new software and hardware, enable decision-making in an organisation. It was determined that hardware is used more as a commodity whereas software is more flexible and constitutes the bulk of the IT investment. IT investments enable strategic decision-making on management level and support employee decisions within their daily operations. The organisation is making substantial investments in IT to align organisational strategies with innovative functional operations and to provide extended organisational networks. Managers find that the IT investments enable them to make quick and high-quality business decisions daily. Thus, it is important for managers from the various business units to have access to high-quality data in their decision-making processes. It is found that an important IT investment decision taken by the

CEO is to outsource their IT services; this benefits the organisation indirectly by saving costs. The study from the 12 participants has revealed and confirmed that routine and programmed decisions are the most common types of decisions in the organisation. Certainly, the existing activities in the organisation are highly dependent on operational decisions.

The research objective was to establish what IT investments influence decision-makers. The participants identified the IT investments used in their decision-making and could show how the organisation benefit from their IT investments.

6.3.3 Main research question

The main research question for this study is as follows: What are the views of decision-makers that influence their IT investment decisions in an organisation? The answer to this question is that decision-makers acknowledge the importance of the organisation's IT investments to enable decision-making on all levels. IT investment provide the information needed to take informed decisions to ensure the organisation stays competitive and operations run smoothly. They have already incorporated several IT investments and are willing to invest even more to keep up-to-date with technological advances.

The aim of the study was to explore the views of the decision-makers in a specific organisation to establish how their decisions influence the organisation's IT investment. The views of the decision-makers indicate that IT investments assist in making decisions that are informed and that it is worth investigating in IT.

6.4 Reflection on research

Looking back to the beginning of this research, it is clear that the aim and objectives were achieved. In hindsight, more data could have been collected using more data collection methods to probe more deeply. This would have given this research a fuller and clearer interpretation on the impact of IT investment on decisions in an organisation. Furthermore, the findings highlighted from the 12 participants would have carried more weight if interviews were also conducted with the director and chairman of the organisation. In addition, the views of the consulting company currently supporting the business system could also have added more insight.

6.5 Contributions

The literature highlights that many studies have been conducted into the research of IT investment. However, the researcher has not specifically found any studies which focus on

organisations in South Africa. Studies have shown that government and large businesses have directed their focus on implementing technology to compete in the modern environment. As shown and discussed in various literature, in the recent last two decades the availability of Internet and cost of Internet usage have plummeted considerably. This has changed the attitude of how business is conducted in a developing country such as South Africa.

6.5.1 Knowledge contribution

In previous studies, the focus was primarily on how decisions are made concerning investment of technology. The findings of this study contribute to insights of IT investments in an SMME in the South African context.

6.5.2 Methodological contribution

For this kind of research, a single case study was used. The method applied to collect data was semi-structured interviews. A total of 12 participants were engaged from various business units in the organisation for the interviews. The data collected from the interviews were analysed by a Microsoft Excel spread sheet and content analysis. It is important to note the use of diagrams, tables and percentages to analyse the findings as revealed in Chapter 4. The methodological contribution was the application of semi-structured interviews in practice for a single case.

6.6 Conclusion

This thesis is concerned with the influence of IT investment on decision-making in an organisation. Thus, it is important to note that this research has identified that real-time data plays a strategic role in supporting decision-making on all levels of the organisation. Moreover, this research has found that IT investments are used to improve the efficiency and effectiveness of an organisation by reducing the bounded rationality of decision-making. Recommendations were offered based on the findings within the organisation. Further research focusing on decision-making for IT investments is recommended for South African SMMEs.

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APPENDIX A: Ethics certificate




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Faculty's

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APPENDIX B: Permission letter



EXCELLENT MEAT

Committed to Excellence

Excellent Holdings Pty Ltd
Epping Close, Epping Industria, Elsies River, 7480, Cape Town
P.O. Box 91, Elsies River, 7490
Tel: (021) 929 7300 Fax: 021 931 7331
Registration Number: 1998/005233/07

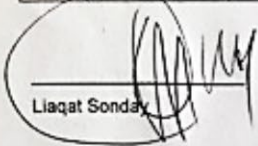
Date: 27/09/2018

I Liaqat Sondag in my capacity as Director at Excellent Holdings Pty Ltd give consent in principle to allow Ashfaaq Ahmed Mahmood a student at the Cape Peninsula University of Technology (CPUT), to collect data in this company as part of his/her Master of Technology research. The student has explained to me the nature of his/her research and the nature of the data to be collected.

This consent in no way commits any individual staff member to participate in the research, and it is expected that the student will get explicit consent from any participants. I reserve the right to withdraw this permission at some future time.

In addition, the company's name may or may not be used as indicated below. (Tick as appropriate).

	Thesis	Conference paper	Journal article	Research poster
Yes	x			
No				


Liaqat Sondag

27/09/2018

Directors: LA Sondag, A Sondag, MS Sondag, I Sondag

APPENDIX C: Introduction letter



Postgraduate studies and research
Graduate School of Business Management
Business & Management Sciences Faculty
Keizersgracht and Tennant Street
Zonnebloem | 8000 | Cape Town

To whom it may concern

Re: Introductory letter for the collection of research data

Ashfaaq Ahmed Mahmood is registered for the MTech: Business Administration degree at CPUT with student number 187021406. The thesis is titled “**The impact of information technology investment in selected small businesses in the Western Cape, South Africa.**”, and aims to determine whether information technology can provide competitive advantage to the firm. The main supervisor for this research is Dr Michael Twum-Darko.

In order to meet the requirements of the University’s Higher Degrees Committee (HDC) the student must get consent to collect data from organizations which they have identified as potential sources of data. In this case the student will issue a questionnaire to gather relevant data.

If you agree to this, you are requested to complete the attached form (an electronic version will be made available to you if you so desire) and print it on your organisation’s letterhead.

For further clarification on this matter please contact either the supervisor(s) identified above, or the Departmental Research Committee Secretary at 021 460 3833.

Regards

A handwritten signature in black ink, appearing to read "Michael Twum-Darko".

Dr. Michael Twum-Darko

Postgraduate Studies and Research
Graduate Centre for Management
Faculty of Business and Management Sciences

Date: 20 September 2018

APPENDIX D: Introduction letter

Interview Guide and Consent Form for Participation in a Research Study



Title of the Research:

The impact of information technology investment in selected small business the Western Cape, South Africa

1. Description of the research and your participation

You are invited to participate in a research study conducted by Ashfaaq Mahmood .The purpose of this research is to investigate the relationship between investment in Information Technology and the impact it will have on a selected small business.

Your participation will involve the following:

Answering of questions posed in respect of impact of information technology investment

2. Risks

There are no known risks associated with this research.

3. Potential benefits

This research will enable Excellent Meat Holdings to better understand their level of readiness to respond to and recover from a disruptive even and to maintain continued service delivery (both internally and externally). It will also facilitate a common understanding on how impact of information technology investment is to be managed.

4. Confidentiality

All information provided will be kept confidential. Everything will be done to maintain the confidentiality of records that may identify you. Your identity will not be revealed in any publication resulting from this study. All responses, notes and records will be kept in a secured environment.

5. Voluntary participation

Your participation in this research study is voluntary. Should you choose not to?

participate or withdraw your consent to participate, you may do so at any time. You will not be disciplined should you decide to withdraw or no longer participate in the study.

6. Contact

Should you have any questions, concerns or require clarity in respect of the study kindly contact Ashfaaq Mahmood at 0834193786.

7. Consent

I have read this consent form and understand the requirements. I herewith give my consent to participate in this study.

Signature of participant

Date:

Copy of this consent form will be given to you for record keeping purposes.

APPENDIX E: Consent letter

Consent Form for Participation in a Semi-Structured Interview

Title

of the Research:

The impact of information technology investment in selected small business the Western Cape, South Africa

No. Statement Please

Initial question:

1. I confirm that I have read and understood my participation in the Research Study dated **[insert date]**. I have had an opportunity to ask questions and obtain clarity.
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without there being any negative consequences. Furthermore, should I not wish to answer a question or questions, I am free to decline.
3. I understand that my responses will be kept strictly confidential. I understand that my name and that of my Department will not be linked with the research materials, and will not be identified or identifiable in the report or reports that result from the research.
4. I understand that neither I nor my Department will be personally identified. I am in agreement that extracts of the discussions may be used for reporting purposes as long as I and my Department are not personally identified. Thank you for agreeing to participate in the Research Study. Kindly indicate by initialling in the boxes below if you agree with each of the statements.
5. I Understand that no other use will be made of the recording without my written permission, and that no outside the research team will be allowed access to the original recording.

6. I agree that the data collected during the study will be kept for future research purposes such as publications related to this study after the completion of the study.

Name of participant

Date

Signature

Research Student

Date

Signature

APPENDIX F: Interview guide

DRAFT INTERVIEW SCHEDULE QUESTIONS: *GENERIC*

Interview will be schedule in advanced and will be approximately 1 hour per participant

PARTICIPANT: _____

DATE : _____

NAME : _____

Semi-structured Interviews questions.

SRO1. *To identify how investment in IT affect organization?*

Q. How is IT used to take decisions?

A.

Q. How does the IT investment benefit the organisation?

A.

Q. How does the IT investment influence decisions in the organisation?

A.

Q. Please provide an example of how the IT investment benefit a decision in the organisation – what was the outcome?

A.

Q. What challenges are experienced with the IT investment in the organisation?

A.

Q. How do the challenges of the IT investment influence the decisions?

A.

Q. Please provide an example of a challenge with the IT investment that influence a decision – what was the outcome?

A.

Q. What would be in your opinion a good IT investment for decision-making in the organisation?

A.

SRO2.

Q. What are the IT investments in the organisation?

A.

Q. How was the IT invested in the organisation?

A.

Q. Who decides what IT to invest in?

A.

Q. What decisions are taken in the organisation?

A.

Q. Who takes decisions?

A.

Q. How are decisions taken?

A.

Q. What is the experience of the decision-makers in using the IT investment in the organisation?

A.



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ChickPeaEnglish@gmail.com
ChickPea Proofreading & Editing

**49A York Close, Parklands, 7441
 Western Cape, South Africa**

Certificate of Authenticity

CERTIFICATE: COA081122RDLH

16 November 2022

To Whom It May Concern

This is to certify that “**IMPACT OF INFORMATION TECHNOLOGY INVESTMENT IN A SELECTED SMALL BUSINESS IN THE WESTERN CAPE, SOUTH AFRICA**” by Ashfaaq Ahmed Mahmood, for the Faculty of Business and Management Sciences at the Cape Peninsula University of Technology (CPUT), under the supervision of Dr Retha de la Harpe, has been professionally edited by Dr. Laura Budler Kleinhans of ChickPea Proofreading and Editing Services for Students and Professionals.

Job Number	Document Title
081122RDLH	IMPACT OF INFORMATION TECHNOLOGY INVESTMENT IN A SELECTED SMALL BUSINESS IN THE WESTERN CAPE, SOUTH AFRICA

Dr. Laura Budler Kleinhans
CEO ChickPea Proofreading & Editing

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APPENDIX H: Similarity report

The impact of information technology investment in selected small businesses in the Western Cape, South Africa

ORIGINALITY REPORT

15%	14%	6%	0%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

MATCH ALL SOURCES (ONLY SELECTED SOURCE PRINTED)

3%

★ hdl.handle.net

Internet Source

Exclude quotes On

Exclude matches < 5 words

Exclude bibliography On