AN INVESTIGATION OF GUIDELINES FOR THE ADOPTION OF A SUSTAINABLE ENTERPRISE RESOURCE PLANNING SYSTEM: A SOUTH AFRICAN GOVERNMENT INSTITUTION PERSPECTIVE

by

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ABSTRACT

This study aims to investigate the feasibility for South African government institutions to adopt guidelines that will assist in adopting a sustainable ERP system to improve their information systems strategy and thus reduce costs brought about by the inadequate use of resources.

A systemised literature review was carried out from reputable journals to identify factors that contribute to the successful implementation of ERP systems and aspects that are seen to restrict the adoption of a fully integrated system. This study followed the mixed research methodology (qualitative dominating). In order to collect a variety of data in this study, a survey was distributed to 20 participants with closed-ended questions to collect numerical or quantitative data and open-ended questions to collect narrative or qualitative data in the same study. The TOE process model framework and a set of "critical success factors" were combined from the literature to provide a framework from which survey questions were developed.

Quantitative data were analysed using excel, while qualitative data were analysed by identifying themes (thematic analysis) in the data gathered. There were 103 initial codes extracted while analysing the data generated from the open-ended questions in Atlas.ti. A total of 57 codes were chosen after constant comparison and merging of comparable codes. 13 factors were identified that allow ERP systems to be successfully implemented and used. Nineteen issues that restrict ERP implementation and its full adoption were also identified in the field study. The current state of ERP implementation and adoption in the organisation under investigation indicate that the ERP system is being accepted

successfully and that growth is being achieved gradually and steadily. It also suggested that the platform has a reasonable adoption rate and is adequately supported. The maturity of the organisation and system is high, and all modules are in use.

The study was significant in that it focused on the concerns and obstacles that organisations experience before adopting ERP projects and the challenges that arise after the system is adopted. Furthermore, this research adds to a better knowledge and analysis of core competencies to establish corrective measures before the occurrence of various issues and obstacles during the installation of ERP systems in organisations. The significance of the results is in that a framework of guidelines has been developed. This makes it an original contribution to the body of knowledge.

Keywords: Government, Enterprise Resource Planning (ERP), systems, deployment, business, implementation, benefits, challenges, critical success factors, organisation

1 INTRODUCTION

1.1 BACKGROUND INFORMATION

Public sector organisations in South Africa and around the world encounter many challenges due to their complex legislative requirements, social responsibilities, and higher public expectations. In the early 1980s, governments across the world started to experiment with several ways to change how they do things. One of the improvements they developed was improving functions and processes through Enterprise Resource Planning (ERP) systems (Fernandez, Zainol and Ahmad, 2017).

ERP systems are defined as a combined software package comprised of a set of standard functional modules (production, human resources, sales, and finances), integrated by a vendor, which can, in turn, be enhanced to suit the specific needs of each customer (Botta-Genoulaz and Millet, 2006). There are other definitions of ERP from other scholars, and one of them is: "ERP systems are computer-based systems designed to process an organisation's transactions and facilitate integrated and real-time planning, production, and customer response" (Fernandez et al., 2017).

ERP systems have evolved as information technologies and have become more advanced with continued diversity in business demands. The fundamental idea of ERP systems is to use information systems and technology to improve the ability of organisations to plan and integrate resources, such as production, design, sales, finance, procurement, and additional applications and processes of several other functions. The existing ERP applications programs can be traced back to the applications of Material Requirements Planning (MRP) as well as Manufacturing Resource Planning (MRP-II). The Gartner Group adopted the concept of ERP from MRP-II in the early 1990s. ERP systems were initially identified for use by manufacturing companies. Currently, ERP systems comprise all integrated information systems that any organisation can use for its operations and decision-making. After being in use and continuous development for the past decade, ERP systems have become the crucial means and backbone for today's business operations. From the perspective of management perspective, the idea behind ERP is to optimise

efficiency by using the organisations' internal resources, with emphasis on the integration of system functions, organisational departments, and geographical regions across the organisation. From the perspective of a technological point of view, ERP systems are characterised by online transactional processing that is distinct from the traditional data processing system. These systems offer real-time response processing and integrated applications. ERP systems are primarily used in financial applications for business and financial management, human resources applications for salaries, the management of employee benefits, and other human resources functions. In manufacturing, these systems are used for production management and inventory controls. Complementary technologies are then used in conjunction with ERP systems to meet the requirements of the e-commerce era. These technologies harmonise the functions of business applications, and they include the Internet of Things (IoT) and other telecommunication technologies (Huang, Chiu, Chao and Arniati, 2019).

There are three current major international ERP vendors, namely, SAP, ORACLE NET SUITE AND MICROSOFT DYNAMICS 365 (Medicherla and Archana, 2022; Sravan Medicherla and Archana, 2022; Sharma, Rane, Puro and Nimkar, 2020). On the other hand, Gartner (2022) identified the following four international leading Cloud ERP application vendors (See Figure 1 (Gartner's magic quadrant for Cloud ERP – product-centric enterprises)):

- Oracle (Fusion Cloud ERP).
- Workday.
- SAP (S/4HANA).
- Oracle (NetSuite).
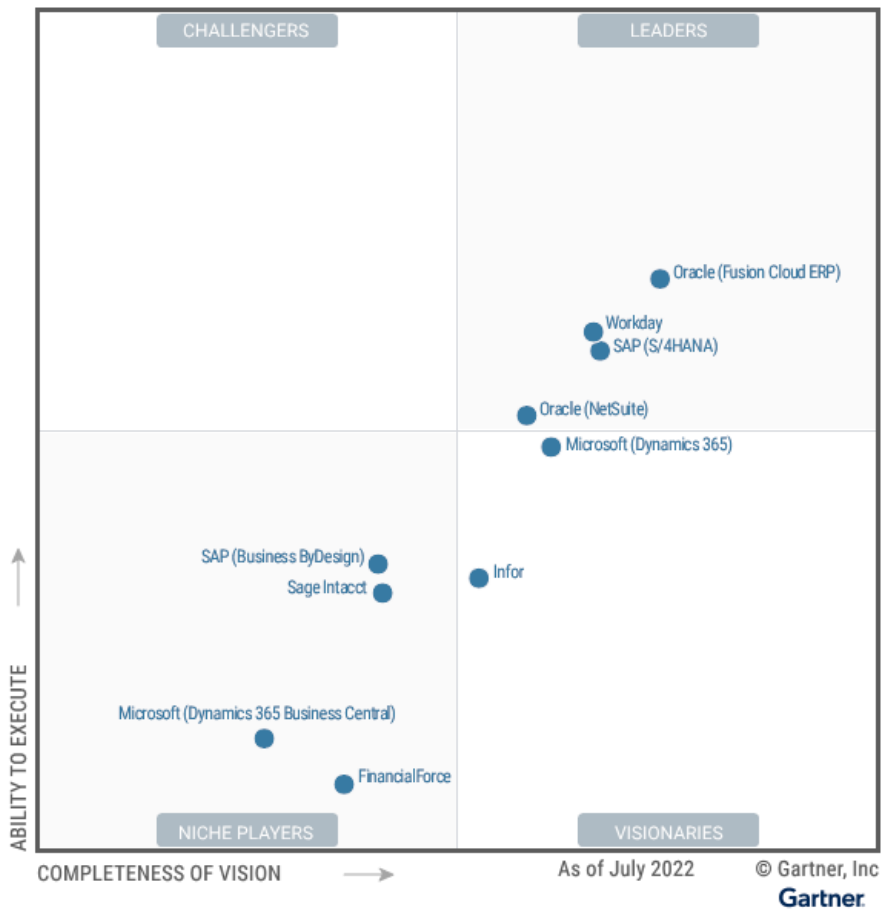
Figure 1: Gartner's magic quadrant for cloud ERP - product-centric enterprises (Gartner, 2022)

Organisations implement ERP systems for the following reasons, amongst others (Botta-Genoulaz and Millet, 2006; Medicherla and Archana, 2022):

- One single source of data across the organisation.
- Improved productivity by the effective use of resources.
- Organisation's competitive advantage.

1.2 PURPOSE OF THE STUDY

The purpose of this study is to establish a set of guidelines and develop a framework for South African government institutions to adopt that may facilitate the adoption of a sustainable ERP system to improve their information systems strategy and thus reduce costs brought about by the inadequate use of resources.

The contribution of this study is significant for other researchers, ERP consultants, and governmental organisations because it adds to a better knowledge and analysis of core competencies to establish corrective measures before the occurrence of various issues and obstacles during the installation of ERP systems in organisations. The process model to be used and critical success factors that will be identified in the literature review may provide a useful guide for organisations planning to implement ERP systems.

1.3 PROBLEM STATEMENT

ERP systems have been in existence since the early 1960s around the world, but there appears to be a problem with their full adoption within the public sector domain in South Africa (Lechesa, Seymour and Schuler, 2012; Nwankpa and Roumani, 2014; van Vuuren and Seymour, 2013). According to Nwankpa and Roumani (2014), some institutions have adopted ERP systems; however, these systems are not being used to their full capabilities as some of the work is still done manually; that is, some ERP modules are implemented for some departments, whereas other modules are not used at all or used incorrectly. This, in turn, hinders the organisation's resources from delivering services promptly to the public and is also a waste of time to execute manual functions that would otherwise be automated.

A study that was done by Ng, Gable and Chan (2003), discovered that the primary reason for limited usage of ERP systems is because the users have a poor understanding of the system and thus create workarounds, thereby indefinitely limiting ERP system usage. Additionally, it was observed that some institutions do not have the right experience and the required expertise in managing the deployment, maintenance, and upgrades of ERP systems (Ng et al., 2003). According to van Vuuren and Seymour (2013), the ERP

systems adoption failures have been attributed in part to the poor fit between the information systems strategy and the organisational background into which that system is now being presented. That is, when a system that is implemented successfully in a developed economy is implemented in an emerging economy, such can negatively affect the effective adoption due to cultural differences and other factors. A study conducted on the adoption and management of ERP systems at the strategic level concluded that there is division among the managers across functional departments in the same organisation (Macharia, 2019). Janssens, Kusters and Martin (2020) claim that ERP projects are frequently over budget and time and fall short of stakeholders' expectations despite 20 years of practice and study.   It is said that around 70% of ERP installations fail to produce projected advantages, and three-quarters of these projects fail. These initiatives are, on average, 78% over budget, 2.5 times longer than expected, and only deliver 30% of the benefits promised. According to Janssens et al. (2020)'s research, 58% of these projects ran longer than projected, and 45% went over budget. Despite the best information, thorough preparation, and project management practice, ERP installations can reveal considerable unexpected behaviour based on Janssens et al. (2020) observations. As a result, the quest for means and strategies to make ERP system implementations more successful continues to be significant (Janssens et al., 2020).

There is an increasing need for government departments to improve their operational productivity in order to manage business complexity and also position themselves to deliver on their mandate. A study by Elgohary (2019) has documented the benefits of successfully using ERP systems in an organisation. The study aimed to examine the impact of ERP capabilities on low-cost advantage, differentiation advantage, and decision-making efficiency to determine if each category of ERP functionalities can affect competitive advantage and decision-making efficiency on its own or whether these functionalities must be combined to maximise the impact. The researcher further recommends that when organisations implement ERP systems, they must deploy these systems throughout the organisation, as each organisation in the study sample only implemented specific modules and ignored the rest (Elgohary, 2019). Other studies revealed that a well-designed and adequately integrated ERP system improved information sharing amongst business functions, subsequently cutting costs and increasing efficiency, resulting in competitive advantages (Deshmukh and Kumar, 2016).

Furthermore, other authors found that following a step-by-step approach when implementing ERP systems will simplify the process and yield better results (Mahraz, Benabbou and Berrado, 2018).

1.4 RESEARCH QUESTIONS

Main Research Question:

- What framework or guidelines can improve the integration of a successful ERP system in a government institution?

Sub Research Questions:

- What are some of the factors that can impede/restrict a fully integrated ERP system in government institutions?
- What is the current state of implementation in the organisation under study?
- What factors contribute to the successful implementation/adoption of ERP systems in government institutions?

1.5 ASSUMPTIONS

Assumptions that were made concerning this study are:

- The research method and mechanism (surveys, interviews, questionnaires) will result in dependable and consistent responses.
- The participants (Project managers, Business Analysts, Developers, and Test Analysts) will be agreeable to participate in the study.
- The participants will comprehend and understand the questions and provide truthful and straightforward feedback during interviews.
- The participants are part or have been part of the team involved in ERP implementation projects in the organisation (that is, they have experienced the phenomenon of the study)

- ERP systems provide business improvement benefits to organisations.

1.6 LIMITATIONS

This study is limited in the following way:

- The research is limited to one South African government institution. Only one South African government institution will be explored; no other institutions or government institutions in other countries will be explored.
- The research does not go into detail concerning the type of ERP systems the organisation has employed.
- This research does not go through the timelines of deploying ERP systems in detail.
- This research only reports on ERP systems at an extensive level and does not observe the differences between different ERP vendors.

The limitations stated above are not reflected as elements that would compromise the reliability and conclusions of this research.

1.7   BRIEF CHAPTER OVERVIEW

This dissertation is organised into five chapters. The first chapter introduces the background of the study, the objective/purpose of the study, the problem statement, and lastly, the assumption and limitation of the study. The second chapter presents a literature review of related ERP systems studies and discussions thereof. Included in the second chapter is the theory that has been used in this study. Chapter three discusses the methodology, data collection and research design followed by sampling, data collection, data analysis, ethics, and interpretations. Chapter four presents the findings and analysis as well as the discussion of the results thereof. Chapter five is the last chapter of this research, and it presents the recommendations as well as the conclusion. Figure 2 depicts the chapter map below.
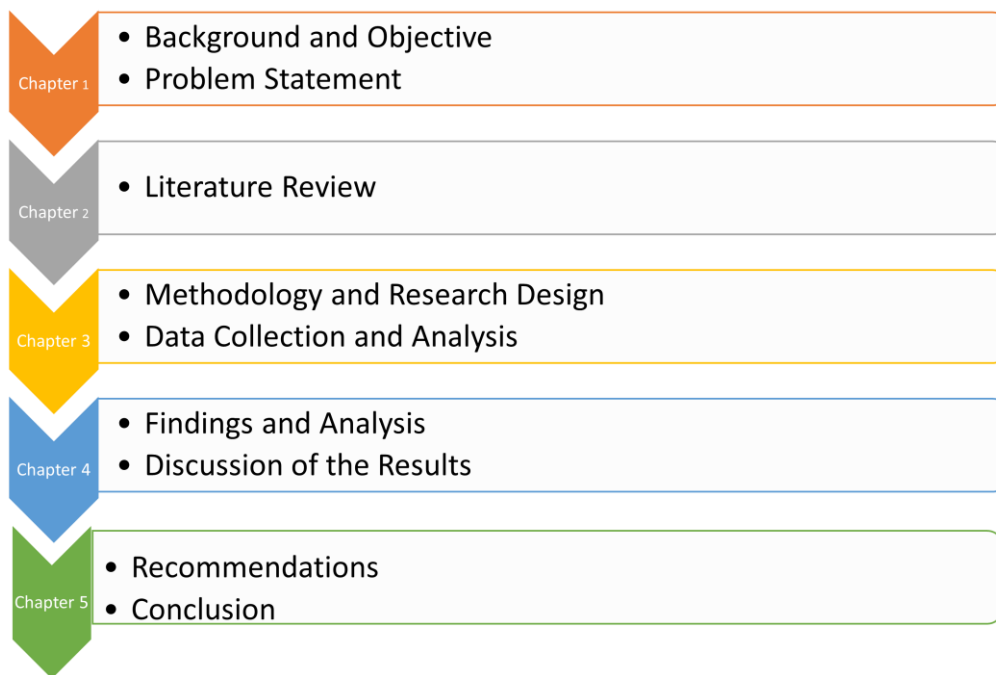
Figure 2: Chapter Map

2 LITERATURE REVIEW

2.1 INTRODUCTION

ERP systems are modules or applications that could provide a fundamental change in the way that the organisation does business. It is a mixture of applications, several business procedures, and departments in a single database or data warehouse to present a holistic view of the business (Fernandez et al., 2017). Components of an ERP system comprise sub-application software, strategic management controls and operational controls, as well as all workers at each level of the organisational pyramid (Jafari and Zolfagharian, 2019). Figure 3 depicts the key modules that would generally be found in an ERP system.

Figure 3: Key ERP Modules (Behance, 2016)

Organisations need computerised information systems as they collect and store large amounts of information daily. Without computerised information systems, it will be very difficult to manage this data. In the absence of ERP systems, these large volumes of data and information are spread across many isolated and incompatible legacy systems where they are separately handled by business units or even regions. These legacy systems provide support for the different business units; however, the systems are not integrated to

allow for better access to correct combined information in the organisation. ERP systems are predominantly intended to solve the disintegration of information in organisations by integrating and standardising procedures of different business units using one comprehensive database. ERP systems collect and integrate data to support the entire organisation's business activities across different business units, regions, and also across the world (Desta, 2016).

2.2 BENEFITS/IMPACT OF ERP SYSTEMS

ERP systems projects are not easy to implement. The implementation often involves high costs, resources as well as a considerable amount of time. Organisations that want to engage in such projects must be conscious of the amount of work involved in the successful completion of the project. The implementation of ERP projects is a critical event in the life of an organisation. When an ERP system is implemented, an organisation expects that there will be a significant positive transformation in the way processes are executed (Chatzoglou, Fragidis, Chatzoudes and Symeonidis, 2016).

2.2.1 Understanding the role of ERP Systems

ERP systems are beneficial tools that build strong competencies, improve performance, provide a competitive advantage, and support better decision-making for organisations. ERP assist management by providing better practices as well as correct integrated information for better decision-making purposes (Desta, 2016). ERP systems are designed for organisations to engage in best practices in specific businesses. Nevertheless, these systems may not be essentially a good fit for the business operating functions in the organisation. ERP software packages are flexible in the sense that they can be customised to fit an organisation's needs better, or the organisation can also modify its business processes to adapt to the ERP software package purchased. ERP customisation can, however, lead to higher implementation costs and can also be time-consuming, consequently tying up resources that could otherwise be utilised for other things in the organisation (Soliman and Karia, 2017). According to Soliman and Karia (2017), it is stated that it is better for organisations to adapt to the ERP system than to change the ERP package to align with the business processes. An organisation that re-engineers business

processes to align with ERP packages experiences improved benefits after implementation. In addition, the organisation may experience a better implementation of the system, which can then improve the stakeholder's fulfilment (Soliman and Karia, 2017). Therefore, in order to take full advantage of implementing ERP systems, management efforts should be on cultivating user adaptation of the system; by doing some customisation of business processes to support existing functions as well as adjusting business processes to align with the best practices of ERP systems (Eid and Abbas, 2017).

2.2.2   Business benefits from ERP systems

The use of an ERP system can bring about many benefits to an organisation. Amongst others, the benefits include cost reduction, improved transparency, better coordination of data from different business units, reduced workforce fatigue, improved management and employee skills, improved business processes, and enhanced capabilities of stakeholders (Jafari and Zolfagharian, 2019). A study done by Soliman and Karia (2017) reported that an organisation realises competitive advantage by applying a strategy that is not being applied by competing organisations. According to Soliman and Karia (2017), the adoption of an ERP system has been associated with achieving competitive advantage in the following ways:

- The ability to propose innovative products and services.
- Effective utilisation of resources.
- Raising access criteria for new opponents.
- Improved negotiating power with suppliers and customers.
- Altering the forces of competition.

Other studies that were conducted discovered that a higher level of alignment between ERP packages and organisational business processes positively influences ERP performance in terms of task performance, time, and cost implications (Eid and Abbas, 2017). According to Lechesa et al. (2012), the perceived business benefits that clients identify with ERP have an impact on the ultimate choice of whether or not to use when looking at the technological characteristics. The analysis uncovered three significant

difficulties in terms of business benefits. The low total cost of ownership (TCO), subscription pay-as-you-go approach, and ease of deployment are the key advantages of using the Software as a Service (SaaS) model. Among the services provided by cloud computing providers, is Software as a Service (SaaS). The SaaS category of cloud services includes cloud ERP system solutions (Mahmood, Khan and Bokhari, 2019). Cloud computing is a web-based system that allows users to access software, data, and services from anywhere across the Internet (Haji, Ahmad, Zeebaree, Dino, Zebari and Shukur, 2020; Alzakholi, Shukur, Zebari, Abas and Sadeeq, 2020). ERP systems, on the other hand, are associated with significant implementation and maintenance costs. As a result, it is projected that the adoption of ERP systems based on the SaaS model will offset the high upfront costs of installations while also lowering the overall cost of ERP systems (Lechesa et al., 2012).

Participants in Mahmood et al. (2019)'s study agreed with the results derived from a study by Burrell (2009), that a reduction in the required upfront implementation expenses is considered a benefit primarily associated with small organisations. Smaller organisations sometimes lack the technical talent and financial resources to manage installed software, so they can profit from SaaS without having to hire employees with the necessary expertise. The investment in ERP SaaS, like any other investment, must be justified using a transparent decision-making methodology. The clients believe that they lack a tool or yardstick to employ as a decision-making tool. This ambiguity makes determining if ERP SaaS is advantageous in terms of return on investment challenging for decision-makers such as participants. The costs and advantages of SaaS have been described as difficult to estimate. Most notably, the cost-cutting benefits of SaaS were panned by the research participants, particularly for some organisations that require quick customisation. However, because in-house ERP systems are viewed as expensive by the participants, ERP SaaS has a chance to gain traction in any sort of organisation, irrespective of size. However, because the participants believe that ERP systems demand flexibility, which affects cost, the topic of SaaS cost reduction cannot be considered in isolation. The perceived lack of customisation of ERP SaaS has a negative influence on ERP SaaS adoption. This is valid not only in terms of potential cost increases but also in terms of the ability to adapt to evolving organisational needs. ERP systems are dynamic, as fast customisations are

frequently required to meet company needs (Lechesa et al., 2012; Mohammed and Zeebaree, 2021).

Lechesa et al. (2012) argue that ERP SaaS, on the other hand, is thought to be rigid. The high level of customisation in a fast-changing environment has a negative influence on cost savings, which has a negative impact on the perceived benefit of ERP SaaS technology. SaaS applications, on the other hand, are said to be loosely connected and include changeable components. Another concern mentioned concerning customisation is the presence of organisations in various countries or parts of the world. According to Guo (2009)'s study findings, the issue of customisation is a major barrier to ERP SaaS adoption. Clients see it as a problem that makes the SaaS model expensive, particularly for ERP systems that need to be agile to respond quickly to changing environments, as well as for facilitating unique processes that provide a company with a competitive advantage over competitors. The fundamental difficulty with application specificity is that ERP is deemed too critical to function on a SaaS model. The majority of the participants in the study conducted by Mohammed and Zeebaree (2021), believed that although some components of ERP might be run as ERP SaaS, the model is better suited to applications like Business Intelligence (BI) and Customer Relationship Management (CRM). According to Lechesa et al. (2012), ERP is not suitable for the SaaS model because it is seen as a core application, mainly concerning critical modules. Also (Lechesa et al., 2012) indicated that the degree to which an application is viewed as critical to corporate operations has a negative impact on SaaS adoption and, thus, ERP SaaS. However, according to Seethamraju (2015), SaaS ERP systems are regarded as the optimal option for Small and Medium Enterprises (SMEs) to realize the benefits of ERP systems without incurring the excessive expenses of IT infrastructure, expertise, software, upgrades, and maintenance.

2.3 CHALLENGES OF ERP SYSTEMS

Implementing ERP inflicts challenges and changes on organisations (Rouhani and Mehri, 2018). It is imperative to recognise that there are several challenges that organisations may come across while implementing ERP systems and that not all implementations can be fruitful (Desta, 2016). However, organisations have engaged in multiple efforts to manage the challenges associated with the implementation of ERP systems. A study done

by Rouhani and Mehri (2018) stated that resistance to change is one of the crucial reasons for the challenges experienced by organisations in implementing ERP systems.

2.3.1   Cultural challenges affecting the adoption of ERP systems

The adoption of ERP systems has become a significant challenge for organisations. This is due to many issues, such as organisational, personal, and managerial issues (Saravanan and Joseph, 2016). The concept of culture can be defined as follows:

Skok and Döringer (2002), in their many definitions of culture, concluded that many studies agreed on the characteristics that will be discussed below:

- A culture is a group of individuals, and these individuals share common ideas, beliefs, and values. They further stated that culture is not the characteristic of individuals. These values, ideas, or beliefs may include occupation, family, region, or national groups, and this is where values are cultured. People become part of a specific culture when they become a member of a group.
- The concept of culture has a historical element. A specific country's culture progresses over a period and is a result of partially the country's past, demographics, economic development, ecological environment, and geography.
- Culture has diverse layers. The layers were defined as four elements, including values, rituals, heroes, and symbols.

Shanks, Parr, Hu, Corbitt, Thanasankit and Seddon (2000) defined the characteristics of culture as follows:

- Culture has an extensive and definite impact on an organisation, the organisation's behaviour, as well as the management style of the leaders. In developing countries, many challenges have been encountered when organisations implement and use management processes, technologies, and information systems techniques that are used in developed countries. The study argued that cultural issues mean that factors that are significant in a particular culture might be less significant in another culture, and the opposite scenario is also true.

- Culture is a combination of beliefs that is inherent inside a society where a person resides, and this is shared amongst the community.
- Culture cannot be inherited; it is something that people learn when they become a member of a particular group or community. Culture replicates the ability of human beings to learn new things, feel, and communicate. Since culture can be learned, it then affects the behaviours of individuals within an organisation and then impacts the organisation. Therefore, culture enforces rules and practices as well as values for societies and organisations.
- Four elements can be used to differentiate culture between counties. The elements are discussed in table 1 below with emphasis on the differences between China and Australia:

Element	China	Australia
Power Distance – Indicates the dependence relationship in a particular country	- High Power Distance - Hierarchical organisation structure - More centralised power and authority	- Low Power Distance - Flat organisational Structure - Less Centralised power and authority
Individualism and Collectivism – group interest vs individual interest	Collectivist society	Individualist society
Avoidance of uncertainty - the level of uncertainty felt by members due to the fear of unknown situations	- Moderate to high uncertainty avoidance - Uncertainty about	- Low uncertainty avoidance - Accepts taking risks as part of the life of the organisation

Element	China	Australia
	unfamiliar situations and risks • Precision is crucial	
Masculinity and femininity – the level of dominance as observed in society	• More feminine society • Managers use intuition equally with logic to solve issues	• Moderately masculine society • Managers are more aggressive • Reasonableness and money dominate • More extensive solutions are seen as the best

Table 1: Cultural differences between countries

2.3.2 Project Management factors affecting ERP systems implementation and adoption

A study was conducted in Jordan by Abu-Hussein, Hyassat, Sweis, Alawneh and Al-Debei (2016), to investigate project management factors that affect the implementation of ERP systems. Communication, human resources, time, and risk management were all discussed in depth during the interview. The following is a summary of the findings of the interviews: The project management area that has the most significant impact on ERP project performance is communication management. This is evident in the project manager's statement: "even if you have the best systems in the world, without effective communication management, the project will fail". The project manager has to promote the system inside the project team, ensuring that all team members understand their role in the success of the project. Risk management, according to the project manager, is also a crucial component determining the project's success as it is linked to all other areas,

including human resources, communication, and also the system's hardware. As a result, risk must be considered at the start of the project for all project variables, and each risk must be studied, monitored, and alleviated during the project life cycle. The consultant must also emphasise the necessity of communication management, mainly because of the participation of multiple departments, as some are overlooked (Abu-Hussein et al., 2016).

Furthermore, the consultant viewed resistance to change as a significant risk in every ERP implementation. In terms of human resources, the project manager emphasises the need to clearly define roles and duties for team members as well as provide training on the nature of the future work expected. According to the project manager, incentives should be added and must always be linked to team member performance. One of the core reasons for ERP project failure, according to the consultant, is poor client team selection, which includes assigning weak and ineffective teams to work with the consultant. Because the project plan must be practical and updated regularly in terms of resources, implementation time, and deliverables, time management is also an important component of the project manager's work. The consultant in this sector emphasises the necessity of top management support and team commitment to actively participate in the project, as the project may be interrupted, postponed, or fail if top management does not enforce their policies on their employees and project staff do not commit. The results of the interviews supported the effect of risk management on ERP project performance, despite the findings of the questionnaire. Finally, the researcher recognised the effect of time management on completing the projects according to the specified specifications, and he validated the relevance of considering the scale of the project when choosing the timeframe (Abu-Hussein et al., 2016).

Project management is a critical component of a successful ERP implementation, and poor project management skills frequently play a part in failed implementations. As a result, having a trained project manager for any ERP project is critical, as is effective communication, which helps to build trust amongst employees and communicate the information essential for a successful ERP deployment. Effective communication can be implemented in a variety of ways, including developing a communication plan, holding frequent team meetings, and disseminating meeting minutes to those who need to know. Furthermore, a well-prepared and qualified team will undoubtedly assist their manager in

completing the project; this can be accomplished by defining clear roles and responsibilities for them to understand their assignments and providing them with the necessary training to improve their capabilities and knowledge level. Motivations and incentives linked to performance and results, on the other hand, will aid the team in sticking to their tasks and achieving the desired results. The ERP project's complexity necessitates taking the scope into account while designing project plans and schedules; also, the timeline must be realistic in order to accomplish the intended goals (Janssens et al., 2020).

2.3.3   Other Complications of ERP Systems adoptions

ERP challenges are part of the larger software engineering (SE) challenges. According to Hussain and Mkpojiogu (2016), user involvement, executive managerial support, a clear statement of requirements, proper planning, realistic expectations, smaller project milestones, etc. were all listed as success factors for SE projects in the 1995 Standish Group Chaos Report. On the other hand, the report listed incomplete requirements, a lack of user involvement, a lack of resources, unrealistic expectations, a lack of executive support, changing requirements and specifications, and a lack of planning as problem causes in SE (Hussain and Mkpojiogu, 2016).

Desta (2016) claims that in an ideal world, organisations must define their business requirements and ERP systems processes during the planning and pre-implementation phases of an ERP system life cycle. This should be done to achieve the best fit between the two processes mentioned. The business processes are dynamic and bound to change as time goes by. This requires organisations to always be vigilant and ready to check the ERP processes to align with the changes in the organisation. Likewise, the adopting organisation also needs to check how they can improve their current processes to match with the best practices of ERP systems to control the misfit that is usually inherent between ERP system processes and organisational business functions (Eid and Abbas, 2017). Several studies were done that described the complications of ERP systems (Ali and Miller, 2017; Mukti and Rawani, 2016; AlQashami and Heba, 2015). One of the significant complications of ERP systems is the integration of existing legacy systems and other applications to deliver a joint interface. In addition, ERP systems are very complex to

implement and can also be time-consuming and expensive for any organisation. Other internal problems can play a role in the complications of ERP systems. Amongst them are a lack of skill of ERP system users, resistance to change, and lack of commitment of top management or implementers. The users may lack the necessary skills to standardise the modules to align with the business processes (Desta, 2016).

Regardless of the advantages, ERP implementations also have a habit of exceeding the time allocated for the project, exceeding the budget, and not doing what it was intended to do. There are many reasons why this happens. One issue that many organisations face when implementing ERP systems is defining what should be integrated and what should not. Sometimes organisations do not have a clear understanding of where system integration can gain a competitive advantage and where it will obstruct the organisation's workflow. This is even more difficult in a big organisation where different business units see each other as competitors instead of one unit working towards a common goal or where office politics are involved. In a situation such as this, decision-makers often do not fully know what benefits the ERP system can introduce to the organisation and also what functionalities the system is capable of, resulting in an ERP system that is not fully utilised in the organisation (Marikar, Ahamed and Musthafa, 2020).

Another major problem with ERP implementations originates from not having well-defined goals and objectives at the beginning of the project. Many organisations also do not have a process in place for modifying these goals as new situations arise (Desta, 2016). Hussain and Mkpojiogu (2016) argue that every successful software project is built on requirements engineering (RE). The failure of software projects can be attributed to a variety of factors, but poorly structured requirements are a significant factor. The 1995 Chaos report claimed that more than 42% of all project success was attributable to proper RE practices. Similarly, inadequate RE processes contributed to more than 43% of software failures (Hussain and Mkpojiogu, 2016).

According to Desta (2016), another issue with ERP system implementations is that they require extensive customisation as well as knowledgeable resources to perform the tasks. When procuring an ERP system, an organisation does not buy a packaged solution but rather a framework that they can use and customise to build a solution. When

management fails to appreciate these two factors, ERP projects are delayed, and organisations experience cost overruns. Other issues that are posing challenges include the fact that ERP systems that are not flexible may force organisations to adapt their business functions to suit the ERP system model. This then necessitates a re-engineering of processes needed to complete certain business functions as well as the reskilling of employees, business associates, and consumers (Marikar et al., 2020). In order to plan and expedite a successful ERP implementation, the difficulties need to be addressed, especially during the planning phase (Desta, 2016).

2.4   IMPLEMENTATION PROCESS OF ERP SYSTEMS

The ERP implementation process involves all phases of implementation, and that includes the development of the primary business case, the planning and preparation of the project, configurations and implementation of the packaged software, and subsequently the enhancements to the business processes. Implementation of ERP is then considered a "business project" instead of a "technological initiative" (Shanks et al., 2000). Ross and Vitale (2000) developed an ERP implementation process model with five phases that were built on 15 case studies that dealt with the implementation of ERP by other researchers. The phases are as follows: "design, implementation, stabilisation, continuous improvement, and transformation". Figure 4 depicts the five phases as depicted in the study:
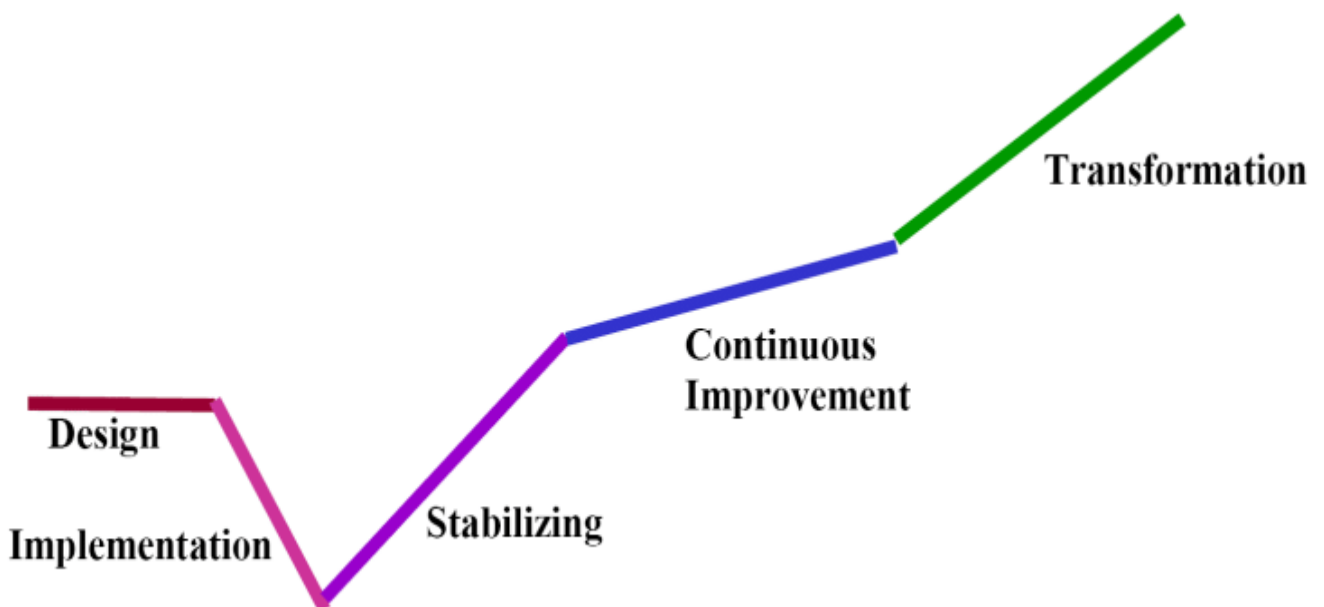
Figure 4: Ross Five stages in the ERP journey (Ross and Vitale, 2000)

The design phase of the ERP implementation process is where the organisation selects the ERP system that is in line with the defined requirements. This phase is also concerned with defining the scope of the project and formulating the system's structural design. The next phase is the implementation phase which involves the configuration and implementation of the software. This phase is considered to be highly unsettling for organisations, and performance usually drops as users must get accustomed to the new systems. After the initial implementation phase, a stabilisation period usually follows where implementation issues that were identified are corrected. Organisational performance usually improves during this time. According to Ross and Vitale (2000), the stabilisation phase can last for months and even years sometimes in many organisations. The next stage of the process is then the continuous improvement of processes. This is done to ensure that the requirements and the system align and that the system does what it is supposed to do. The last stage of the process is transformation. Ross and Vitale (2000) further noted that organisations could get to the transformation stage. However, many organisations plan to do so, and many large implementations of ERP systems may include diverse phases for every single module in the ERP system.

Markus and Tanis (2000) created a four-phased ERP implementation model. Figure 5 below denotes the implementation model:

Ideas to dollars | Dollars to assets | Assets to impacts | Impacts to performance

Phase I

Project chartering

Phase II

The project (configure & rollout)

Phase III

Shakedown

Phase IV

Onward and upward

Decisions defining the business case and solution constraints

Getting system and end users "up and running"

Stabilizing, eliminating "bugs," getting to normal operations

Maintaining system, supporting users, getting results, upgrading

Figure 5: Markus and Tanis ERP Lifecycle (Markus and Tanis, 2000)

The phases found in this model are "project chartering, project, shakedown", and lastly, "onward and upward". The chartering stage is concerned with the development of the business case, the selection of the ERP package to suit the requirements, the identification of a project manager to lead the implementation, as well as the approval of the schedule and budget. The project phase and shakedown phase are comparable to the implementation and stabilising phases of the model by Ross and Vitale (2000). In this phase, configuration, rollout, and the fixing of defects are completed. The onward and upward phases comprise continuous business improvement and transformation, as also found in the last two phases of the Ross model (Shanks et al., 2000).

As much as technical knowledge is essential for the successful implementation of ERP systems, strategic, organisational and people aspects are also crucial. Strong top management commitment is also a critical factor in the successful implementation of ERP systems as these involve significant changes in the organisation. Effective communication, project management, training, and carrying out the implementation of the ERP project are

essential to bind the different undertakings together (Desta, 2016). Research studies have reported that organisations find it hard to realise the benefits associated with the implementation of ERP systems (Huang et al., 2019; Saini, Nigam and Misra, 2013; Žabjek, Kovačič and Štemberger, 2009). Many internal and external factors are involved in the implementation of ERP projects, and this makes the process complicated. The implementation requires the whole organisation to participate for it to be successful. Even though organisations are aware of the challenges inherent in the implementation of ERP systems, many organisations still fail to their lack of acknowledgement of factors such as management support, implementation management, interdepartmental cooperation, and communication (Chatzoglou et al., 2016).

2.4.1 Factors that contribute to the successful implementation of ERP systems in organisations

Shanks et al. (2000) describes 11 "critical success factors" as combined from the literature and that includes: Top management support (that is, the senior management constructive commitment, support and enthusiasm for the project); external expertise (the usage of external consultants that have the right experience and knowledge); balanced project team: (a mixture business people with business process understanding and IT people with technical knowledge); data accuracy (high quality data loaded from existing legacy systems); clear goals (clearly defined goals that are well understood); project management (that is, a detailed project plan with clearly defined project goals); change management (ERP implementations involve changes to business processes; therefore effective change management processes are vital); education and training (IT and business users must be trained on the technical aspects of the system, the operations, and reference models); existence of a champion (there must be an individual that is not necessarily a senior in the organisation that constantly promotes the use of the ERP system); minimal customisation (the scope of the customisation during the implementation must be minimised); Best people full-time: (there must be a full time project team in the organisation that will only focus on the implementation and not assigned to other duties (Shanks et al., 2000).

Nofal and Yusof (2015) describe nine critical success factors that are depicted in figure 6 below:
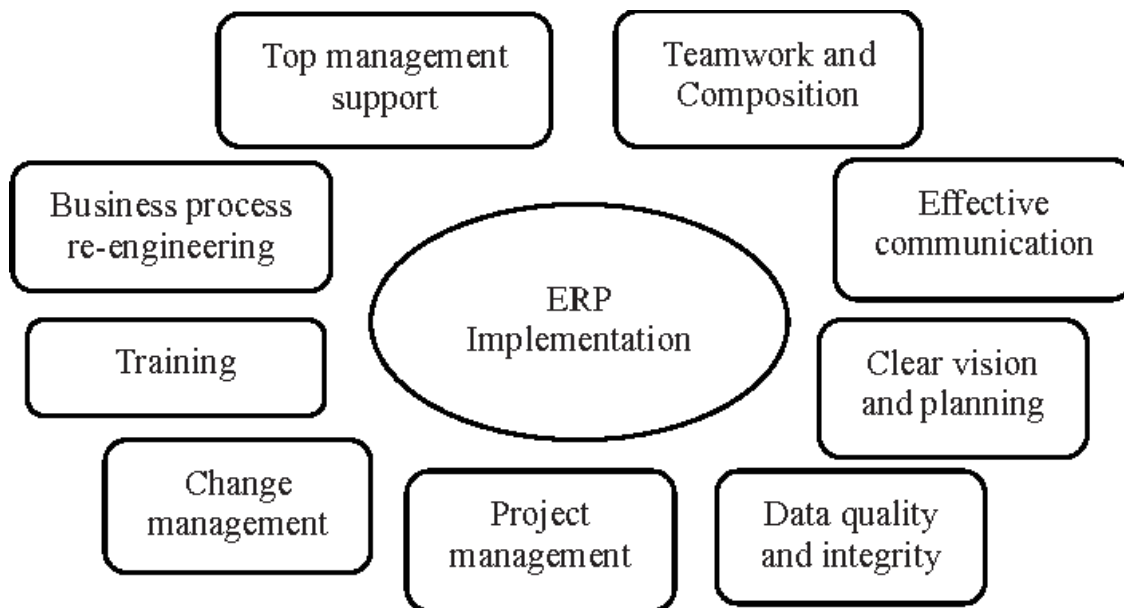
Figure 6: Conceptual framework for ERP Implementation Success Factors (Nofal and Yusof, 2015)

Through a review of the literature that Nofal and Yusof (2015) did, they came up with a proposed conceptual framework that acknowledged the most popular critical success factors for ERP successful implementations in small and medium organisations in Jordan. The factors identified were top management support, data quality and integrity, business process re-engineering, teamwork and composition, project management, clear vision and planning, effective communication, training, and change management. The factors in Figure 6 will be discussed below, together with other factors identified by Saade and Nijher (2016) that also contribute to the successful implementation of ERP systems:

Top Management Support

Top management support was ranked as number one and deemed to be the most crucial aspect of ERP, according to a study conducted by Mahmood et al. (2019). As technology advances, the issue becomes less about technology and more about social issues. Throughout the ERP project's life cycle, a clear strategic direction and vision are required. Before gaining top management support, it is usually a good idea to outline the project's goals and objectives. Among the other findings, the top management approach, i.e.,

strategy, style, or commitment, appears to be the most important. It is nearly universally acknowledged that top management support is important to the success of information technology/information system (IT/IS) projects). As a result, this is also true for ERP implementations (Mahmood et al., 2019; Saade and Nijher, 2016).

Furthermore, other studies conducted in 2003 by Nah, Zuckweiler and Lee-Shang Lau (2003), shared a similar view that senior management in organisations should show concern for projects and allocate resources for implementation. In the case of an ERP project, top management first identifies the interested stakeholders that have a vested interest in the project and then communicates the desired level of involvement to complete the tasks that have been given. ERP deployment typically necessitates changes to existing work procedures, among other things. As a result, top management is responsible for carefully planning the transition process. Several ERP implementation studies have stressed the importance of top management (Huang et al., 2019; Mahraz et al., 2018; Chatzoglou et al., 2016). As a result, a lack of senior management support throughout the implementation of ERP systems across regions and nations may be a severe concern. Mahmood et al. (2019) have also stated that a firm commitment from senior management is required for a successful ERP system installation. To avoid issues/challenges that may surface as hurdles to the successful deployment of ERPs in the contemporary digital environment, organisations wanting to implement ERPs should seek full support and commitment from senior management (Mahmood et al., 2019).

Change Management

Mahmood et al. (2019) ranked number two from the top, change management as one of the critical factors with highly cited frequency in past research. The process of fighting or confronting challenges with adjustments or transformations that may impact the status quo in the organisation is known as resistance to change. Other research conducted by Selander and Henfridsson (2012), found that middle managers are the most resistant to ERP implementation. Similarly, research conducted in 2008 by Chen, Sun, Helms and Jih (2008), found that ERP deployment may experience internal resistance from middle managers who are hesitant to abandon previous working practices. The reason for this was discovered to be that they build their methodology for performing various activities;

however, ERP systems may use different approaches to complete work processes than their methodologies. As a result, middle managers resist any prospective change. Individuals or employees within an organisation often resist change; thus, while implementing ERP, organisations may invest all available resources in encouraging their staff to participate in the transition, which may assist in mitigating the severity of such opposition. Change management initiatives must be prioritised from the beginning of ERP implementations (Mahmood et al., 2019).

Training and Development

Mahmood et al. (2019) ranked number three from the top, training and development as one of the critical challenges facing the organisation. Employee skill development is a key challenge. ERP systems are intricate and necessitate specialised training. Furthermore, when workers lack IT expertise, knowledge transfer for consultants may be more challenging. In most situations, providing ERP issues training to staff resulted in hidden expenditures for businesses. A lack of focus on employee training may be a problem. According to a 1996 study by Koch (1996) on ERP use, 30-40% of staff were unable to operate a new ERP system without sufficient training. Insufficient user training was also identified by Hong and Kim (2002) as an ERP risk factor. As a result, ERP failures may occur due to a lack of training. ERP systems necessitate frequent training, and organisations should give opportunities for employees to improve their abilities to meet change. Other researchers suggested that the training programs must be targeted to persuade ERP stakeholders of the benefits of ERP systems right from the start of the ERP project (Mahmood et al., 2019; Nemathaga, 2020).

Effective Communication

Mahmood et al. (2019) ranked number four from the top, effective communication due to its complexity and significance. Because ERP systems are cross-functional systems, effective communication and coordination among users from various departments participating in ERP implementation are critical. Potential ERP users should be encouraged and included in the selection of ERP packages for the company, according to previous research findings. Effective communication is almost crucial throughout ERP

implementation; thus, all stakeholders must be aware of current information and project status. Many organisations make plans for effective communication among stakeholders with a stake in the ERP project regularly. ERP system implementation necessitates a shift in the organisation's culture. Effective communication helps to ensure that organisational change is implemented successfully. Oral and textual communication methods are also acceptable. Users may become resistant because of poor communication. Effective communication has a significant impact on system adoption, which can aid in the reduction of resistance. During ERP installation, effective communication is essential at all levels. Without a doubt, communication allows the rest of the company to be informed about the project's progress. Employees should be informed of the objectives, scope, activities, and changes that will be implemented for a successful ERP implementation (Mahmood et al., 2019).

System Integration (enterprise resource planning modules)

ERP systems may include numerous modules for the smooth operation of business processes at the department and enterprise levels to fulfil organisational needs. The ERP system's potential benefits may be achieved if it is integrated with other business systems in the organisation. ERP acts as a foundation. During ERP deployment, one of the key difficulties that organisations face is system integration (Bingi, Sharma and Godla, 1999). Mahmood et al. (2019) claim that no single application can fulfil all an organisation's requirements. Furthermore, when the organisation's requirements evolve, different modules from different vendors may be purchased. The ERP system must relate to other business systems (perhaps other ERPs) in the firm to gain optimum benefits. Integration can take place within a single company or outside of it, which is referred to as external integration (Barki and Pinsonneault, 2005). When integrating with a legacy system, the integration of ERP modules looks to be a hurdle (Mahmood et al., 2019).

A legacy system is a computer or software system that has outlived its usefulness and cannot be upgraded to newer versions. Data loss, delays, and a lack of trust in the new system stemmed from a lack of strategies for integrating the legacy system with the new enterprise system. Other investigations conducted by Khan and Bokhari (2018), found concerns with the new ERP system's performance and efficiency because of a lack of

knowledge and poor integration techniques. Khan and Bokhari (2018) also emphasised the importance of a well-thought-out approach for integrating and aligning technologies with current practices. The system integration process is one of the most expensive procedures, costing roughly three times as much as ERP software due to system integrator fees and a lengthy re-engineering process. As a result, system integration is one of the very important factors to consider while installing ERP, and it was ranked number five. Consequently, it could aid in the optimisation of corporate operations and increase efficiency (Mahmood et al., 2019).

Business Process Re-engineering

The issue/challenge concerning business process re-engineering (BPR) is ranked number six based on research findings conducted by Mahmood et al. (2019). BPR is the rethinking and redesigning of business processes to improve organisational performance in terms of quality, cost, speed, and service. Organisational willingness to alter business processes to meet the ERP software while limiting modification is necessary for a successful ERP installation. Because customisations must be re-coded every time ERP systems are upgraded, upgrading customised ERP systems has become costly and time-consuming. Mahmood et al. (2019) also pointed out that while customisations may lead to ERP adoption, they come at a high cost. Major customisations usually necessitate additional maintenance and evolution effort, sometimes including multiple developers (Mahmood et al., 2019). In any firm, ERP installation entails re-engineering an existing business process using best practices. ERP systems failed due to a lack of attention to BPR. BPR may be advantageous to departments and their subdivisions since it encourages the adoption of best practices for the transformation of business processes. Organisations that directly implemented ERP without BPR have lower value in selected performance metrics than organisations that implemented BPR first and subsequently ERP. ERP and BPR are complementary, but BPR is almost required for any organisation's ERP installation to be effective (Mahmood et al., 2019).

Consultants/vendor' selection

Choosing consultants and providers is almost as crucial as deciding which ERP systems to deploy in a company. Vendor selection entails comparing and choosing partners for software, hardware, databases, networks, and other services. Choosing the right product is vital for ERP deployment, and many academics consider vendors and consultants to be a critical component in ERP system performance, ranking number seven in the study conducted by Mahmood et al. (2019). The input of top management is critical when choosing a provider. ERP vendor selection criteria are typically oriented on product characteristics rather than the satisfaction of relevant stakeholders. Financial viability, vendor diligence, and other factors may be considered while shortlisting ERP vendors. ERP systems and business software from Panorama Consulting claim that 50% of participants voiced unhappiness with the ERP vendor. Adequate evidence must be provided to justify the selection of a particular vendor. Choosing consultants and vendors for both ERP and cloud ERP plays an important part in successfully installing such a system in businesses (Mahmood et al., 2019). It is crucial for an organisation to select an ERP that aligns with its values and meets its business requirements. The proper ERP package selection is emphasised in the case studies by Somers and Nelson (2001) and Soh, Kien Sia, Fong Boh and Tang (2003) as one of the CSFs for a successful ERP implementation.

Project Management

The findings of the study conducted by Mahmood et al. (2019) ranked project management as an issue/challenge at the eighth position among other issues, and challenges found. It demonstrates the importance of project management in ERP adoption success. Furthermore, according to earlier studies (Saade and Nijher, 2016), system success is primarily determined by the project management process. Poor risk management, scope creep, and resource allocation issues, as well as vendor management, are some of the issues that arise during the deployment of an ERP system. Project management is concerned with initiating, planning, implementing, and controlling various project operations to meet deadlines. According to Dezdar and Sulaiman (2009) study's frequency analysis of 95 journal articles, project management, ERP team

composition, expertise, and BPR are all essential elements in ERP deployment. A study by Dezdar and Ainin (2011) discovered that project management is one of the most important aspects of a successful ERP deployment. According to the findings, there is a link between project management and ERP adoption success (Mahmood et al., 2019).

Project team formation

Studies conducted by Stratman and Roth (2002) and Saade and Nijher (2016) have identified project team members' competence as one of the critical success factors in ERP installation. One of the extremely challenging aspects of ERP deployment is the formation of project teams. According to the findings of the study conducted by Mahmood et al. (2019), this is the ninth most challenging task that companies face. The implementation of an ERP project may necessitate the participation of all stakeholders in an organisation. A person from each department may be part of the ERP team. Human resource (HR) and information technology (IT) staff were determined to be effective in successfully implementing ERP systems in the firm. Furthermore, members of the project team should have the authority to make decisions that will improve the prospects of a successful ERP deployment. The study also discovered that team composition and competency are linked to ERP implementation success (Mahmood et al., 2019).

Team empowerment/skilled people

Team empowerment/skilled people is ranked number ten in the study conducted by Mahmood et al. (2019). Team empowerment refers to the ability of a group to make decisions based on their preferences rather than relying on top management's permission. ERP implementation necessitates team empowerment because it boosts confidence while also saving time, yet skilled personnel is required to make effective use of authority. Furthermore, previous research has identified team empowerment and skilled individuals as critical factors in the effective implementation of ERP systems in businesses. Furthermore, the lack of skilled HRs may appear to be a problem, as ERP requires employees with specific knowledge. People with a low level of competence concentrate on the core functions of ERP and neglect to use the sophisticated features that the system provides. Most importantly, if a key ERP employee leaves the company, there will be a

significant knowledge gap. To successfully execute and sustain such activities in businesses, organisations must focus on staff development and training (Mahmood et al., 2019).

Organisational culture/language

Organisational issues and challenges related to culture and language were ranked number 11 in the study conducted by Mahmood et al. (2019). Employees' beliefs, attitudes, actions, and principles are reflected in organisational culture. The conclusion drawn from a review of previous research is that organisational culture has a substantial impact on ERP deployment success. The research also discovered a link between organisational culture and ERP success. Similarly, a previous study found that organisational culture contributed to a positive relationship between ERP staff and vendors, which contributed to ERP deployment success. A culture of learning and development, which includes shared beliefs, new ideas, transferrable skills, and knowledge, is required for effective ERP adoption. As a result, company culture may increase employee motivation, lowering the chance of ERP installation failure. Findings by Mahmood et al. (2019) show that organisational culture is extremely important during ERP deployment, and top management must make efforts to create a culture that is conducive to ERP implementation.

End-User perception

How end-users perceive the system plays an important role in achieving success with ERP systems. It also dictates how utilisation will take place, thereby reaping the potential benefits that the system can offer. A study conducted by Asli Yagmur and Jaideep (2018) identified a need for management to recognise the perceptions of the end-users and the areas that yielded satisfaction or dissatisfaction with ERP systems. They noted that when management is sensitive to the factors that yield satisfaction or dissatisfaction, they can thus readily develop and employ proper strategies that are important in improving end-user satisfaction with the system. Areas that are likely to provide resistance can be identified earlier in the process, thereby allowing the organisation to put controls and specific actions in place to mitigate this issue and instead increase the acceptance rate of the new ERP

System. The findings of the research done by Asli Yagmur and Jaideep (2018) were consistent with past studies where it was suggested that corporate transformation needs a proper organisational vision of the future to be defined and an effective change management process to balance forces in favour of transformation over forces of resistance to change.

When observing the deployment of ERP systems, it is crucial to also focus on each stage of the process, the post-implementation phase, and some of the lessons that organisations have learnt since their ERP implementations were completed. The discussion of these elements follows.

2.4.2 Assessment of work done and acceptance criteria at each stage of implementation

Hongyi, Wenbin, Rocky and Chun Yi (2016) developed and validated a stage-by-stage assessment model for the implementation of ERP systems to assist with the assessment of work done and acceptance criteria at each stage of the implementation. This was done to assist with the development of a model to decrease the ERP implementation time and keep the project within the budget (Saade and Nijher, 2016). The actions that were done and the results of their study were as follows (Hongyi et al., 2016):

- Critical Success Factors from previous studies were expanded into Key Performance Indicators (KPIs).
- The KPIs were allocated to the different stages of the ERP system implementation process.
- The critical success factor concepts were tested through empirical observation for validity and reliability separately.
- It was confirmed that the organisation's readiness for ERP must be assessed early in the ERP implementation project as this has a direct influence on the performance and success of the project.
- Each stage of the ERP implementation must be assessed before the project moves to the next stage and not limited to only after the implementation.

- It is better to measure the ERP performance and the project separately as the factors that influence these are different.

2.4.3 Post-implementation

Through a review of prior literature and the Delphi method, Li, Chang, Wang and Chang (2020) compiled a ranked list of internal control items for ERP post-implementation. The study contributes to the literature regarding ERP implementations after implementation, which is a critical post-implementation phase that affects the transfer of knowledge, such as operations, maintenance, training, and testing. The researchers highlighted that even though both anecdotal evidence and previous studies have pointed out the importance of this stage and how its activities differ from those in other stages, they still had a limited understanding of the activities of this stage. According to the research, professional frameworks and standards regarding IT investments are too general for organisations to adjust internal control focus after the formal deployment of the system. Using the study results along with the organisation's existing governance practices, a more specific direction for post-implementation control activities was provided (Li et al., 2020).

2.4.4 Lessons learned when big organisations adopted ERP systems

Malaurent and Avison (2015) wrote an article that builds on a case study they published in 2007, which describes the implementation of an ERP project in a Chinese subsidiary of a French multinational company that was largely unsuccessful. The ERP templates imposed many features that did not fit Chinese realities. As opposed to rejecting the system completely by not using it, Chinese users devised workarounds to deal with the misfits. The ERP system was usable in China but led to problems at the corporate headquarters as some transparency was lost, and the provided information was viewed as possibly misleading. It was decided to set up an evaluation team to determine whether formalising or prohibiting each of these workarounds was appropriate. The results of this evaluation were a system accepted by both users and management. Among the aspects discussed in the case were management attitude changes, the pros and cons of workarounds, communication, and the role of the researcher in enhancing learning. When they considered the potential consequences of failure, management changed its approach.

Although the company's ERP implementation in European, American, and African subsidiaries was deemed successful, the system's failure in Chinese subsidiaries jeopardised worldwide operations. A worldwide perspective of all subsidiaries was required for headquarters to comprehend the organisation's financial state. When the headquarters realised that this costly global initiative was in jeopardy, their focus shifted from ensuring that every piece of the company's standard ERP system was protected and that there are times when local circumstances need divergence from the standard (Malaurent and Avison, 2015).

Malaurent and Avison (2015) further claimed that workarounds emerge organically as a result of adjusting to misfits. Workarounds, rather than being arbitrary and deviant, can be seen as excellent practices that aid in recognising and resolving cultural, linguistic, financial, and legislative inconsistencies, at least in the near term, until more secure procedures are established. When major ERP systems are installed globally, such misfits are not uncommon, but the case study revealed that users might work around the assumed inflexibility. Workarounds can be a positive reaction when resistance and failure are the only options. However, they can and should also stimulate long-term positive organisational reform to prevent embedding the shortcomings of informal workarounds into the culture. Another crucial component mentioned in the case study was communication. It is not new to emphasise the significance of communication in information systems practices, but the situation emphasised the point. Headquarters had a "take it or leave it" attitude when rolling out its ERP system in Chinese subsidiaries, which drove users to "leave it"! The headquarters consultants did not stay long enough in position, and there was a language barrier because English was the only language available. Neither the Chinese users nor the French consultants spoke it as their first language. The designation of (mostly self-appointed) champion key users who met to discuss various ways to work past the template's constraints in the Chinese setting made a difference. Discussion groups, email communications, and newsletters were also beneficial. However, owing to poor communication, headquarters management was unaware of these workarounds – and their consequences for a worldwide picture of the company's financial status until later, when their negative impact became evident. The project team's mission statement includes strong communication as a critical component in resolving the workarounds. A communication effort was launched to assist users in following the standardised localised

procedures while also supporting local Chinese procedures and fostering a sense of teamwork. At the time, there was a willingness in both environments to address these concerns. The team made sure that users were involved in decisions regarding how to deal with workarounds so that the system adjustments were acceptable to both headquarters and Chinese users (Malaurent and Avison, 2015).

The conclusion of Malaurent and Avison (2015)'s case study focused on the research approach of the work they initially published in 2007. During the initial case study phase, the author worked as an ERP consultant before becoming an unpaid researcher and completing a case study. Interviews, observations, and the inspection of documents relevant to the apparent ERP failure were used to obtain data for the case study. Because the project report, which served as the basis for a Masters dissertation, was to be provided to management, the corporation agreed. The ramifications of what was going on with the ERP deployment in China were both surprising and alarming to the management at the French headquarters; therefore, this presentation had a huge impact. As a result, the researcher was invited to form and serve as an unpaid co-leader of the workarounds team. The researcher collaborated with ERP practitioners to make improvements to practice rather than merely watching and reporting to management (Malaurent and Avison, 2015).

2.4.5 The motivation of ERP Systems deployment in a government institution to assist in the delivery of the mandate

Due to government organisations' social obligations and higher legislative and public accountability, they are now increasing the adoption of ERP systems to understand various benefits such as an integrated real-time data system, better administration, and result-based management (Botta-Genoulaz and Millet, 2006; Medicherla and Archana, 2022). Furthermore, as the pressure from governments continues concerning efficiency and effectiveness, ERP systems will be required to enable and better manage processes in government institutions, both upstream and downstream, and without loss of the value of services provided to the general public (Poba-Nzaou, Uwizeyemungu, Raymond and Paré, 2014).

2.5 THE CURRENT STATE OF IMPLEMENTATION IN GOVERNMENT INSTITUTIONS IN SOUTHERN AFRICA

Most developing countries are now using e-Government platforms in the form of ERP systems and other information technology systems. While developed countries can jump technology generations, the same cannot be said for developing countries. Developed countries generally develop technical systems alongside institutional development, thereby advancing at all levels to achieve competitive advantage. Developing countries anticipate making the same journey as fast as developing countries. Content (2016) conducted a study where interviews with 56 participants in ten government institutions were done in Rwanda. These organisations were all involved in implementing a government enterprise management system. This was done to determine how critical success factors found in the literature on the implementation of ERP systems relate to the current state of the Rwanda public. The author found that there is a large gap between what was anticipated as the benefits that would be derived from the implementation and the results due to a strong emphasis on the technical side of the implementation and little concern regarding the organisational change issues (Content, 2016).

For a research effort, a theoretical framework may be required as it serves as the foundation on which all knowledge is based. It offers the structure and basis for the study's justification, problem formulation, purpose, significance, and research questions (Osanloo and Grant, 2016).

2.6 THEORY

A theoretical framework stipulates the crucial variables that impact the phenomenon of interest (Baker, 2012b). There are suggested adoption models that have been used to track the rate of technological innovation diffusion as well as adoption (Awa, Ukoha and Emecheta, 2016). These models include:

- Technology acceptance model (TAM) (Davis, 1989);
- Theory of reasoned action (TRA) (Ajzen and Fishbein, 1980);
- Theory of planned behaviour (TPB) (Ajzen, 1991);

- Innovation diffusion theory (IDT) (Rogers, Singhal and Quinlan, 2014);
- Stage model (SM) (Poon and Swatman, 1999);
- Technology-environment-organization (TOE) (Tornatzky, Fleischer and Chakrabarti, 1990);
- Resource-based view (Caldeira and Ward, 2003).

Awa et al. (2016), argues that even though many grounded adoption theories (such as TRA, IDT, and TPB) are useful in a variety of fields, they do not expressly target Information and Communication Technology (ICT) acceptance in a similar manner as TAM and TOE frameworks. The generic factors proposed by TAM provide more illuminating lenses for examining user perceptions of specific systems, user adoption processes, and implementation as well as potential future challenges; the technology's effects on the value chain and post-adoption diffusion; and the expansion of organisational capabilities using the technology. The theories of TAM and TOE specifically address technology adoption and are most frequently used as the theoretical foundation for many Information Systems (IS) studies that clarify end-user adoption at the organizational level. TAM's extensive reliance on technological factors at the expense of social and psychological factors, however, restricts the extent of its explanatory and predictive capabilities and necessitates its integration with other frameworks (Awa et al., 2016).

TPB attempted to make up for TAM's oversights, however, their frameworks have not been used to support as many studies in the modern IS field as the TOE framework. IDT framework uses organisational and technological context components to explain adoption, but TOE went one step further and integrated environmental context constructs (Awa et al., 2016). In comparison to other adoption frameworks (such as TAM, IDT, TRA, SM, and TPB), the TOE framework is more comprehensive, industry-friendly; and has more solid empirical support in the IS field (Xu, Ou and Fan, 2017; Oliveira and Martins, 2011; Zhu, Kraemer and Xu, 2003; Zheng, Yen and Tarn, 2000; Kuan and Chau, 2001; Yoon and George, 2013). It satisfies the current scholarly demand for more social interactive systems that address the difficulties of ICT systems (Awa et al., 2016). Therefore, the Technology-organisation-environment framework (TOE) theoretical model is most appropriate for this study (Baker, 2012a). See Figure 7 for the TOE framework.
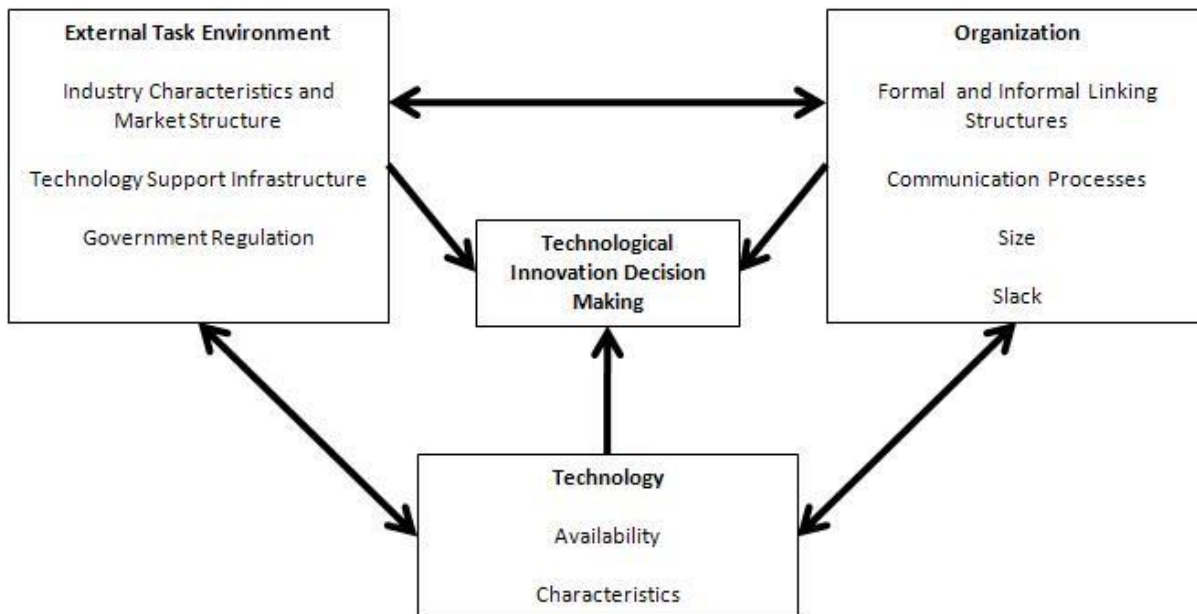
Figure 7: The Technology–Organisation–Environment Framework (Baker, 2012b)

The TOE framework denotes how the organisational setting guides the adoption and implementation of innovations. The framework is a theory that states that three elements of an organisation's environment influence innovation adoption and implementation decisions. These three elements are the technological, organisational, and environmental settings. All these three elements are positioned to influence technological innovation. Using this theoretical framework in this research assisted the researcher in explaining the factors that influence the adoption of ERP systems in governmental institutions as it has been widely used for complex innovation adoptions (Baker, 2012b).

The TOE model has been shown to have broad application and explanatory power across a variety of technological, industrial, and national/cultural contexts through extensive research. The TOE has been applied in implementations and adoptions to explain inter-organisational system adoptions. The technological, organisational, and environmental factors of a company all have an impact on innovation uptake. Given this fact, the TOE paradigm looks to be continuing to give meaningful direction to researchers and practitioners (Baker, 2012b).

The three components of the TOE framework are discussed below:

2.6.1   The Organisational Context

According to Baker (2012b), the organisational context refers to the firm's characteristics and resources, such as people ties, intra-firm communication routes, firm size, and the quantity of accessible slack resources. This environment has a range of effects on adoption and implementation decisions. Procedures that link internal organisational subunits or traverse internal barriers, for example, foster creativity. The availability of linking representatives such as product champions and gatekeepers is linked with adoption (Zhu et al., 2003; Hambrick and Mason, 1984; Chuang, Nakatani and Zhou, 2009). An example of such systems is found in organisations where cross-functional teams and employees have formal or informal relationships with other departments or value chain partners. The relationship between the organisational structure and the innovation adoption process has been investigated more broadly. Organic and decentralised organisational systems are linked with successful adoptions. These organisations value collaboration, offer some flexibility in employee responsibilities and encourage lateral communication as well as communication within reporting lines. While organic and distributed structures may be better suited to the adoption phase of the innovation process, power-driven (rather than organic) structures focus on formal communication relationships, top-down decision making and clearly defined roles for employees and are therefore better suited to the implementation phase (Baker, 2012b).

Baker (2012b) further argues that communication strategies can either stimulate or stifle creativity within an organization's framework. Top management may stimulate innovation by cultivating an organisational atmosphere that welcomes change and encourages new ideas that enhance the company's core mission and vision. Top management leadership and communication processes include describing the role of innovation within the overall strategy of the organisation, emphasising the importance of innovation to subordinates, formally and informally rewarding innovation, emphasising the history of innovation within an organisation, and developing a skilled executive team that can cast a compelling vision of the organisation's future. On the other hand, slack and scale are two of the most commonly discussed organisational qualities that influence innovation. While much

research implies that slack fosters adoption, other research suggests that innovation can occur without it. Slack is desirable and beneficial, but it is neither necessary nor significant for innovation to occur (Baker, 2012b).

2.6.2   The Technological context

Baker (2012b) defines the technological context as one that encompasses all relevant technologies to the organisation, including those that are now in use as well as those that are available in the marketplace but not yet in use. Existing technologies are crucial in the adoption process because they limit the extent and speed of technical change that a company can make. Existing but unimplemented innovations impact innovation, both by defining the boundaries of what is feasible and by demonstrating to businesses how technology may help them change and adapt. There are three sorts of innovations in the group of inventions outside the organisation: incremental, synthetic, and discontinuous changes (Tushman and Anderson, 2018). New features or versions of current technologies are introduced through incremental innovations. For the adopting organisation, incremental innovations pose the least degree of risk and disruption. Transitioning to liquid crystal display (LCD) computer monitors from cathode ray tube (CRT) or upgrading from one version of an ERP system to a newer version of the same system are two examples. Synthetic change represents a middle ground of moderate change, in which existing ideas or technology are blended in unique ways. The transmission of course content via the Internet by universities is such an example. There are no new technologies employed in recording, storage, or transmission, and there is no innovation in course materials. As a result, current technologies are merged in an innovative way to create something new (Baker, 2012a). In conclusion, businesses must carefully assess the kind of organisational changes that will result from using new technology. Some inventions will have a huge impact on the company and the industry it competes in, while others will have a minor impact (Baker, 2012b).

2.6.3   The Environmental Context

The legislative environment, as well as the industrial structure and the existence or absence of technical service providers, all, contribute to the environmental context

(Pflughoeft, Ramamurthy, Soofi, Yasai-Ardekani and Zahedi, 2003; Awa, Nwibere and Inyang, 2010; Al-Qirim, 2004). The structure of the industry has been studied in a variety of ways. For example, fierce rivalry encourages the adoption of new technologies. Furthermore, dominating enterprises in the value chain might sway the innovation of other value chain partners. In terms of the industry life cycle, it is stated that companies in quickly rising industries are more likely to innovate. Some businesses take advantage of an industry's collapse to innovate by implementing efficiency measures or expanding into new lines of operation. Other businesses may forgo investing in innovation to save money. The infrastructure that supports technology has an impact on innovation (Baker, 2012a). Firms that must pay high costs for skilled workers are frequently forced to innovate to save money. Innovation is also aided by the availability of trained personnel and consultants or other technology service providers (Baker, 2012b).

Lastly, Baker (2012b) argues that government regulation can have a positive or negative impact on innovation. When governments enforce new restrictions on industry, such as requiring pollution-control equipment for energy companies, innovation is effectively stifled because the more rules enforced in a space, the more difficult it becomes for industries to accommodate innovations as the focus is more on complying with the rules, rather than on innovating new inventions. Similarly, in a variety of businesses, strict safety and testing regulations can stifle innovation. Another example is banking, where privacy regulations may restrict banks from offering new ways for users to access their account data. As a result, government regulation can either stimulate or stifle innovation (Baker, 2012b). Overall, these three environments – technological, organisational, and environmental create limits and opportunities for technological innovation (Baker, 2012a). These factors have an impact on the level of technical innovation at an organisation (Baker, 2012b).

2.7 CONCLUSION

To conclude this chapter, it can be derived that the benefits claimed for ERP systems were factors such as operating and maintenance costs of Information systems that were reduced, increased efficiency of business processes, reduced administration costs and improved quality data for decision making, as well as the increased capability to handle organisational growth (Shanks et al., 2000).

The challenges and complications of ERP systems implementations were also identified in this chapter. The challenges identified were organisational, and there was also a human element involved as culture was also stated as one of the biggest challenges that an organisation can encounter when deciding on implementing an Information Systems project. A comparison of cultural factors was made between China and Australia, and it was apparent that organisational dynamics are strongly influenced by a person's beliefs and values as learned when they become part of a group or community. There is a compelling suggestion that a lot of ERP systems projects are not finalised in the required time and within the set budget. There is also evidence of ERP implementation systems projects that have completely failed. It was also noted that ERP projects are complex, and failure can be attributed to many factors such as poor budget and time estimations as well as continuous changes in the project scope. Careful planning is essential for the successful implementation of these systems (Shanks et al., 2000).

The TOE conceptual framework, as cited in Baker (2012b), was introduced and explained as a tool that will guide the researcher to assist with understanding and explaining the challenges and benefits that are encountered by the government institution under study.

The organisations must select an appropriate ERP package that suits their business needs and that fits in with the organisation's culture. The directory of best business processes and practices should be adhered to and referenced to always stay on track. Continuous monitoring and evaluation of the business processes are essential to ensure that the organisation stays abreast of new technologies and processes in the industry (Saade and Nijher, 2016).

In summary, many researchers have mentioned some important implementation requirements which are critical in the implementation of ERP systems that will yield the expected benefits and success (Mahmood et al., 2019; Mahraz et al., 2018; Chatzoglou et al., 2016; Nofal and Yusof, 2015). The first step is to ensure that the organisation has a clear understanding of the goals and objectives of the implementation of the ERP system. This is then followed by top management commitment, effective project management, a competent project team, accuracy and integrity of the data, proper education and training, evaluation and measurement of performance in every stage of the implementation process were some of the factors identified as critical to the successful implementation of an ERP system (Saade and Nijher, 2016).

The literature included the following pros:

- The critical success factors were identified to predict ERP implementation success. These critical success factors were ranked in order of importance by researchers (Saade and Nijher, 2016; Mahmood et al., 2019; Mahraz et al., 2018; Chatzoglou et al., 2016; Nofal and Yusof, 2015). These factors that were considered more critical were found to be consistent across the respective studies. These critical success factors were beneficial in the current study as the researcher observed if they were also identified in the field study. The factors that were identified in the field study were incorporated into the framework that was created to assist organisations in the successful implementation of ERP systems.

The literature included the following gaps:

- The focus on governmental institutions has been limited and therefore additional research will be beneficial.
- Few published empirical studies were carried out in African countries and therefore the present study aims to cover this gap found in the literature.
- The studies in the literature mainly aimed at identifying factors that may assist in the successful implementation of ERP systems, there are currently not many studies that measure an organisation's success rate post ERP implementation (Li et al., 2020). More research is required in this area.

Management of an organisation, consulting companies, ERP vendors and Cloud ERP vendors can apply these findings of the studies conducted by other researchers over the years to improve their products and also enhance client satisfaction by focusing on areas that are important to the end-users of the system (Asli Yagmur and Jaideep, 2018).

3   METHODOLOGY

3.1   INTRODUCTION

Research methodology has been defined by Leedy and Ormrod (2020) as "the general approach the researcher takes in carrying out the research project" (P.32). A research paradigm is a proven set of standard views, attitudes, and assumptions about the nature and conduct of research that a group of researchers shares. "Ontological, epistemological, axiological, aesthetic, and methodological beliefs" are examples of beliefs. A research paradigm refers to research culture (Johnson and Onwuegbuzie, 2004). Qualitative, quantitative, and mixed methods research are the three primary research methodological choices.
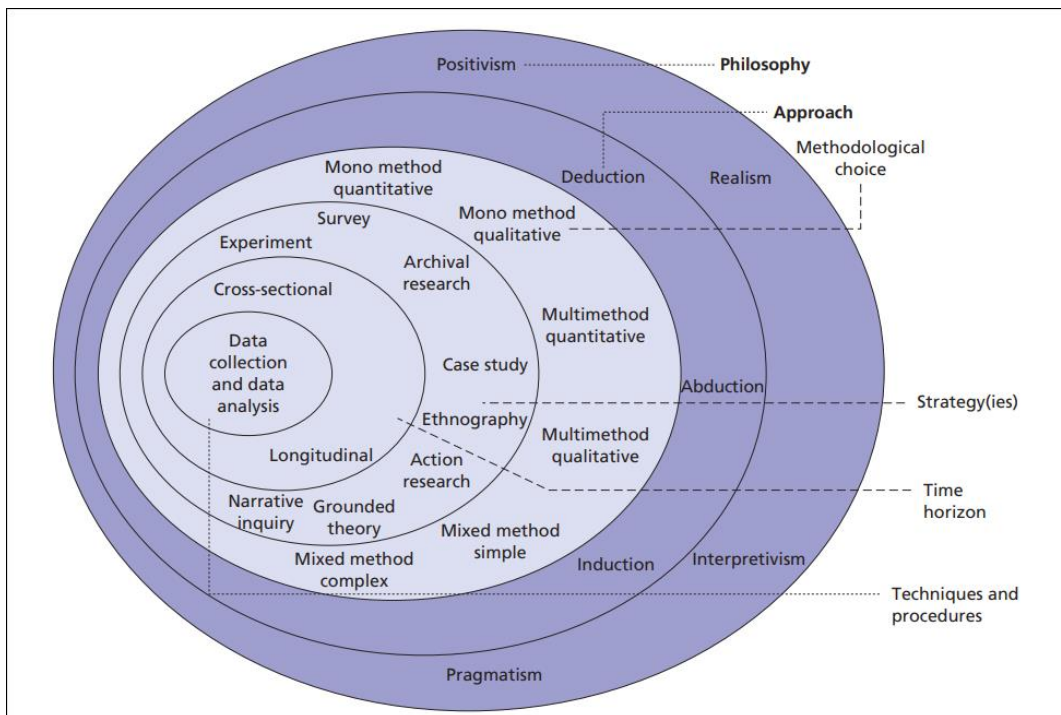
Figure 8: The Research Onion (Saunders, Lewis and Thornhill, 2009)

Qualitative Research Methodological Choice

Williams (2007) indicated that qualitative research methodological choice is a holistic learning strategy that includes an investigation. Qualitative research can also be defined as a model that unfolds in a natural setting and allows the researcher to establish a level of depth by active participation in the actual events. One attribute of qualitative research is the social phenomenon being investigated from the participant's point of view. The study strategy is framed by a variety of qualitative research designs. As a result, the diverse methodologies have a major impact on the research techniques examined. Qualitative research comprises describing, explaining, and interpreting data collected. Qualitative research is carried out using a poststructuralist paradigm. Case study, ethnographic study, phenomenology study, grounded theory study, and content analysis are the five types of qualitative research (Creswell, 2013). These five domains are illustrative of inductive reasoning and associated methodologies-based research (Williams, 2007). The premises of qualitative research are based on inductive rather than logical reasoning (Saunders et al., 2009). The researcher's attempt to explain comes from the observational aspects that generate questions (Williams, 2007).

Williams (2007) further argued that in comparison to quantitative research, where the researcher is totally outside of the phenomena being researched, qualitative research has a strong association between the observer and the data. This empirical research uses evidence gathered via the senses to explain phenomena related to social behaviour in new and emerging theories. Despite the evident differences between quantitative and qualitative research methodologies, significant differences in each methodology have been discovered. There are various approaches to performing qualitative research. However, scholars advocate the following five: Case studies, grounded theory, ethnography, content analysis, and phenomenology are all examples of research methods. Studies explain how these strategies can be used to satisfy various needs. Case studies and grounded theory research, for example, investigate processes, activities, and occurrences, whereas ethnographic research examines individuals' or groups' broad cultural sharing behaviours. Individuals can be studied through case studies and phenomenology (Williams, 2007).

Quantitative Research Methodological Choice

Williams (2007) defines the quantitative research methodological choice as one that gathers data to quantify information and applies it to statistical analysis to support or deny "alternative knowledge assertions". Quantitative research, according to scholars, began in the physical sciences, particularly chemistry and physics. As a data analysis methodology, the researcher employs mathematical models. Research design, test and measurement methodologies, and statistical analysis are three historical themes in quantitative research. Quantitative research also entails collecting quantitative data, with the researcher often employing mathematical models as a data analysis tool. In addition, the researcher uses inquiry methods to guarantee that the statistical data gathering approach is followed. Quantitative research is divided into three categories: "descriptive, experimental, and causal-comparative" (Williams, 2007).

According to Williams (2007), the descriptive research technique is a fundamental research method that looks at the situation as it is at a particular point in time (cross-sectional time horizon, see the research onion in Figure 8). Descriptive research comprises observing and defining aspects of a phenomenon, as well as looking into the link between two or more occurrences. The researcher explores the treatment of an intervention in the study group and then measures the treatment's outcomes during the experimental research. True experimental research designs lead to a complete approach to gathering and analysing quantitative data, which involves mathematical models. The quasi-experimental approach, on the other hand, incorporates a non-random selection of study participants. As a result, control is limited, and actual experimentation is ruled out. Validity may be sacrificed since the variable cannot be controlled. The researcher studies how the independent variables are affected by the dependent variables in causal-comparative research, which involves cause and effect linkages between the variables. In contrast to the dependent variable, the factorial design concentrates on two or more categories with the independent variables. The causal-comparative study design allows the researcher to look at how independent variables interact with one another and how that influences dependent variables. Quantitative research can be done using a variety of methodologies. Correlational, developmental design, observational studies, and survey research are all employed in descriptive research. These research methodologies can be

employed in an experimental and causal-comparative study to varying degrees (Williams, 2007).

Mixed Methods Methodological Choice

In the mid-to-late 1900s, the mixed methods approach to research became popular. According to a study published by Johnson and Onwuegbuzie (2004), the mixed methods methodological choice to research gave researchers an option to assume that quantitative and qualitative research choices are incompatible and that their associated procedures cannot and should not be blended. Researchers subsequently combined methods of data collection and analysis from quantitative and qualitative research choices in a single study (Shi, Wang, Chen and Zhang, 2020; Mikalef, Boura, Lekakos and Krogstie, 2019; Tashakkori and Creswell, 2007; Denscombe, 2008; Teddlie and Tashakkori, 2009). That is, in order to address the research question(s) stated for a given research study, researchers gather or analyse not just numerical data, as is typical for quantitative research, but also narrative data, as is customary for qualitative research (Williams, 2007).

Mixed-methods research is described as a type of study in which the researcher employs both quantitative and qualitative research techniques, methodologies, approaches, concepts, or language in a single study. Mixed research employs the pragmatic technique system from a philosophical standpoint. See the first outer layer of the research onion (Figure 8). Induction (pattern discovery), deduction (the testing of ideas and hypotheses), and abduction (obtaining and depending on the quality of a good set of explanations for interpreting one's results) are all part of its logic of inquiry. Mixed methods research also aims to legitimize the use of several methodologies to answer research questions rather than limiting or constraining researchers' options (i.e., it rejects dogmatism). It is a sort of research that is both vast and creative, rather than one that is restricted. It is inclusive, pluralistic, and complementary, and it advises that researchers select methods and think about and conduct research in an eclectic manner (Johnson and Onwuegbuzie, 2004; Halcomb and Hickman, 2015).

Johnson, Onwuegbuzie and Turner (2007) argue that to effectively combine quantitative and qualitative research, researchers must first analyse all the essential qualities of each.

Traditional quantitative research, for example, places a strong emphasis on deduction, confirmation, theory/hypothesis testing, explanation, prediction, standardized data collecting, and statistical analysis. Induction, discovery, exploration, theory/ hypothesis formation, the researcher as the primary instrument of data gathering, and qualitative analysis are the main aspects of classical qualitative research. Understanding the advantages and disadvantages of quantitative and qualitative research allows a researcher to mix or combine methodologies and employ what academics refer to as the underlying principle of mixed research. According to this concept, researchers must compile multiple data sets utilizing a variety of tactics, approaches, and methods for the resulting mixture or combination to have balancing strengths and non-overlapping weaknesses. Because the product will be superior to monomethod studies, effective application of this principle is a primary source of the rationale for mixed methods research (Johnson and Onwuegbuzie, 2004; Scammon, Tomoaia-Cotisel, Day, Day, Kim, Waitzman, Farrell and Magill, 2013).

As indicated by Johnson et al. (2007), mixed-method research comes in a variety of forms. The individual who self-identifies as a mixed-methods researcher calls the area surrounding the continuum's centre equal status home. The logic and philosophy of mixed methods study serve as a starting point for this researcher. When most, if not all, research issues are considered, these mixed methods researchers are likely to assume that qualitative and quantitative data and procedures will provide insights. Qualitative dominating mixed methods study is another sort of mixed methods research that arises from the continuum depicted in Figure 9. This type of research is denoted by the letters QUAL +quan. This part of the continuum would be appropriate for qualitative or mixed methods researchers who believe it is critical to incorporate quantitative data and methodologies into otherwise qualitative research initiatives Qualitative dominant mixed methods research has been defined as the type of mixed methods research in which the researcher takes a qualitative, constructivist-poststructuralist-critical approach to the research process while also acknowledging that quantitative data and approaches are likely to benefit most research projects (Johnson et al., 2007). Quantitative dominating mixed methods research is another sort of mixed methods study that arises from the continuum depicted in Figure 9. QUAN+qual research is the abbreviation for this type of study. This section of the continuum would be appropriate for quantitative or mixed

methods researchers who believe it is critical to incorporate qualitative data and approaches into otherwise quantitative research efforts. Quantitative dominating mixed methods research has been defined as the sort of mixed methods study in which the researcher takes a quantitative, post-positivist approach to the research process while also acknowledging that qualitative data and procedures are likely to help most research initiatives (Johnson et al., 2007).
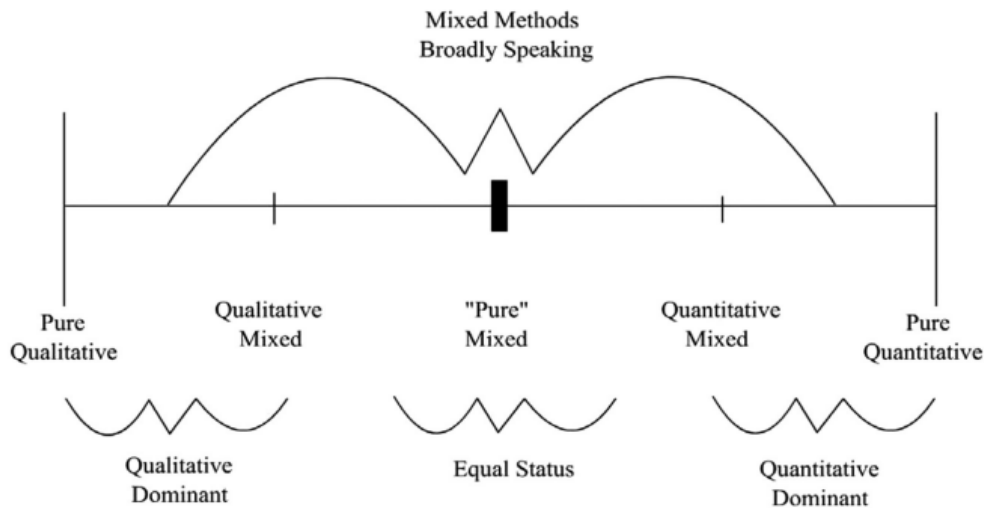
Figure 9: Three Major Research Paradigms, Including Subtypes of Mixed Research Method (Johnson et al., 2007)

The Research Onion

Saunders et al. (2009) theoretical "research onion" (Figure 8) served as the foundation for the research design used in this study. The primary layers or steps that must be completed in order to develop an effective technique are described in detail by the research onion. The main philosophy of the research, the selection of approaches, methods, and strategies, as well as the establishment of time horizons, are the starting points for the research methodology. These steps together carry the research logic to the research design, which includes the primary techniques and procedures for data collection and analysis (Melnikovas, 2018). In research, the outer layers of the onion represent the root, and the inner layers represent the foundation. They are essential for creating a study design that is acceptable and in line with the goals and research questions. The research design needs to be both justifiable and comprehensible (Sahay, 2016).

This study's research design was constructed using the research onion as a guide, as outlined in the next section. There are six main levels in the research onion (Melnikovas, 2018). Research philosophies and their implications constitute the first layer, which is then followed by methodological choices, strategies, approaches, time horizons, techniques, and procedures (Sahay, 2016).

3.2 RESEARCH DESIGN

3.2.1 Research Philosophy

Research philosophy is the first outer layer of the research onion and establishes the foundation of the study by defining ontology (the nature of reality), epistemology (the sources of knowledge or facts), and axiology, (the values, principles, and ethics) of the study (Melnikovas, 2018). Mixed research employs the pragmatic technique and philosophy system from a philosophical standpoint (Johnson et al., 2007). In contrast, in this study, the researchers interacted with the phenomenon, deliberated on the phenomenon, and analysed their findings, which is inherent in the interpretive philosophy (Sahay, 2016).

The philosophy followed for this research is the interpretive philosophy as shown in the outer layer of the research onion, Figure 8. This has enabled the researcher to gain an understanding of the factors that are contributing to the successful adoption of a fully integrated ERP system at a South African government institution. It also enabled the researcher to identify those factors that are contributing to the current problem where ERP systems are not fully integrated. Since interpretivism argues that truth and knowledge are subjective and depend on a person's experience, culture, and historical experiences, their understanding of things will be influenced by such (Ryan, 2018). This has enabled the researcher to gain a better understanding of different people with their understanding of the phenomenon and why it exists. In interpretivism, researchers are not separated from their own beliefs and values; therefore, this has also influenced how the researcher collected, analysed, and understood the data. Interpretivism is associated with understanding the deeper meaning of text and documents. Interpretivism suggests that there is no single shared reality between individuals or organisations (Ryan, 2018). For

example, every person in the organisation had their personal view and experience of the ERP system. This was informed by their interactions with the system as well as previous experience with using the systems. This reflects the suggestion that different realities make up a participant's view of the same phenomenon. This is due to individuals' different understandings that are influenced by cultural norms, social settings, and definitions of the situation (Ryan, 2018).

3.2.2   Research Approach

Melnikovas (2018) indicates that the research philosophy on the preceding level can be used to establish an approach to theory creation, which often includes, deduction, induction and abduction. The research approach is the outer second layer of the research onion (Figure 8). With the deduction approach, the investigation begins with an established theory, then poses a query or hypothesis and gathers data to either support or refute the idea. With the induction approach, the research process begins with observation and data gathering and moves to description and analysis to develop a hypothesis or a conclusion. With the abduction approach, observing an empirical phenomenon is the first step, which is then followed by research that develops a best estimate or conclusion based on the information at hand. Deductive reasoning is used to test theories that already exist, but inductive reasoning is frequently used to create new theories or in sectors where there haven't been as many studies on the subject (Melnikovas, 2018). Inductive reasoning was used in this research study as the researcher first gathered data and then analysed the data to establish a conclusion.

3.2.3   Research Methodological Choice

The research methodological choice is the third outer later in the research onion (Figure 8). This study followed the qualitative dominating (QAUL+quan) mixed research methodology (see Figure 9). To collect a variety of data in this study, the researcher distributed a survey with closed-ended questions to collect numerical, or quantitative, data and open-ended questions to collect narrative, or qualitative, data in the same survey (questionnaire) (Johnson et al., 2007). Surveys are used to obtain matching information from a bigger group of people or events in a uniform and orderly fashion. One then looks

for patterns in the information gathered, which is then generalised to larger populations than the targeted group (Oates, 2005). The purpose of employing a mixed-methods approach to this research was for the researcher to create theories by combining the strengths and flaws of quantitative and qualitative research approaches. The fact that quantitative and qualitative research approaches are compatible and complementary supports the need for more mixed methods research investigations (Williams, 2007). The rationale for using the mixed-method research choice was based on the five extensive purposes of mixed methodological conclusions as defined by Johnson et al. (2007):

a) Triangulation (seeking convergence and corroborating evidence derived from multiple methods investigating the same phenomenon)

b) Complementarity (looking for elaboration, improvements, illustration, and clarification of the findings from one method with the findings from the other method), and

c) Development (using the findings from one method with the findings from the other) (Johnson et al., 2007).

3.2.4 Research Strategy

The research strategy is the fourth outer layer in the research onion (Figure 8). The theory, research, and philosophy selected guided the researcher regarding the kind of data that needed to be collected. Data were collected from individuals with the necessary knowledge and experience in the identified institution. The data was generated in the form of the survey research strategy (See Figure 8, the fourth layer from the outer layer in the research onion) and included the following data generation techniques as defined by Oates (2005):

Questionnaires – a pre-defined set of questions in Likert Scale format were used to determine the factors that can impede/restrict or support the full integration of ERP systems. These were collected for the quantitative analysis. For qualitative analysis, open-ended questions were posed in the same questionnaire where respondents were allowed

to respond freely. Refer to Appendix A for the complete list of questions. A survey focuses on collecting the same kind of data from a large group of people. This has allowed the researcher to find patterns in the data, which has, in turn, enabled a more extensive population generalisation rather than just focusing on the group targeted. This has allowed the researcher to do qualitative data analysis to find themes and categories (Oates, 2005).

Williams (2007) argues that in qualitative research, the grounded theory makes meticulous use of the data, and therefore it was selected as the correct strategy for the qualitative part of the study (Refer to the research onion in Figure 8). Rather than drawing on theory at the start of the investigation, this strategy derives theory from the evidence gathered during it. The data underpins the theory. For example, the data could be coded and classified by the researcher, leading to the formation of a theory. Grounded theory research is defined as a researcher's attempt to develop a wide, comprehensive understanding of a phenomenon, activity, or interaction through the perspectives of study participants. Grounded theory research starts with data and evolves into a theory. The term grounded describes the environment of this method, while the research stipulates that the theory must originate from field facts rather than from research literature. Because this method studies people's activities and interactions, grounded theory has mostly been employed in sociology. The continual comparative technique is a methodology for grounded theory research that involves gathering data, interpreting it, and repeating the procedure. The format for analysing data in grounded theory research, which involves open coding, axial coding, selective coding, and building a theory, has been agreed upon by academics. Finally, a grounded theory report includes five components: a description of the research topic, literature review, technique description, data analysis, explanation of the theory, and discussion of the implications (Williams, 2007).

In this study, the TOE process model framework and a set of critical success factors were combined from the literature to provide a guideline from which survey questions were developed. The TOE theoretical framework limited the scope of the data gathered as it focused on specific variables and viewpoints used in the analysis and interpretation of the collected data. The framework assisted in understanding the concepts as defined, thus assisting in challenging and validating the theoretical assumptions to build knowledge (Baker, 2012a).

3.2.5 Research Time Horizon

The time horizon layer is the fifth outer layer and establishes the time frame for the investigation (Figure 8). It might be cross-sectional (short-term), requiring data collection at a certain time, or longitudinal, requiring data collection over a period of time in order to compare data (Melnikovas, 2018). The research time horizon for this study was cross-sectional as data was collected at a point in time.

3.2.6 Research Techniques and Procedures

The data generation technique used was questionnaires, see the inner layer in the research onion in Figure 8. The participants in the study included management, business analysts, test analysts, and all other stakeholders involved in the planning and implementation of the ERP systems in the organisation. The participants were sourced by identifying the individuals that satisfied the researcher's criteria and then sending them an email to complete the questionnaire for the survey. The data collected comprised the general background information of the organisation, the current state of ERP system implementation, challenges faced with ERP system usage in the organisation, the current ERP implementation process model as well as what the organisation considers as critical success factors in the implementation of ERP systems.

3.3 SAMPLING

According to Alvi (2016), a sample is well-defined as a collection of a small number of people nominated from a population for research purposes. The name participant is given to the members of the sample. Sampling refers to the process that is done to extract a sample from a population. In research, it is not possible to assess all the elements of a population individually; therefore, a group of people that are fewer in number than the whole population is then chosen to conduct studies. As information is gathered from the selected group/sample, interpretations are then made for the population. In order to generalise and obtain highly accurate interpretations, the sample must have a high representation of the population. A sample is "representative" if the features of the elements chosen are comparable to those of the whole population targeted. The results

are considered "generalisable" if the conclusion found from the selected group/sample is equally truthful for the whole population targeted. At times, the sampling processes may come across issues such as sampling biases or systematic errors. Systematic errors are classified as incorrect representations of the sample, which can be due to over or under-representation of one characteristic or other characteristics. Sampling bias can be classified as an occurrence when the selected group or sample does not reflect the characteristics of the targeted population correctly. For example, a researcher selects a sample in a hospital setting based on the friendliness of the participants or the fact that they look approachable and willing to participate in the research. In this instance, the sample does not represent the entire hospital population because even unfriendly and aggressive people also form part of the target population. In this case, sampling is considered biased due to the researcher's judgment (Alvi, 2016).

3.3.1   Target population

Alvi (2016) defines the target population as all the members of a population that meet certain criteria for a research study. In this current study, the population refers to all entities that are involved in the planning, implementation, testing, support, and users of ERP systems in the organisation under study. An entity of any population that cannot be decomposable further is termed an element. In the context of this study, an element refers to an individual, a business unit, or an organisation as a whole, and that will be determined by the nature of the population. A population is determined by the nature of the study. A population can be classified as "homogenous or heterogeneous". A homogenous population refers to an instance where all the elements are similar to each other in all facets; that is, all the elements have all the characteristics that satisfy the defined criteria of the target population. A heterogeneous population refers to one where the elements are not similar to each other in all facets; that is, one characteristic variable is not the same among all the elements, but then the rest of the elements satisfy the rest of the criteria of the target population. Variables can vary from study to study to make a population heterogeneous. A heterogeneous population can have variables such as age, gender, ethnicity, or socioeconomic status. For this study, the population was homogenous as it did not matter whatever socioeconomic, gender, or religious group the employees belonged to (Alvi, 2016).

3.3.2   Sampling method

Sampling methods are generally classified into two important categories: Probability sampling methods and non-probability sampling methods.

Probability Sampling Methods

Alvi (2016) classifies probability sampling as random or representative sampling. With this method, each member of the population has an identified probability of being included in the sample, thus making the value non-zero. The researcher then uses a specific form of random selection. The probability is allocated to individual units of the population quantitatively. This technique requires the researcher to define the population precisely. Furthermore, this technique is not usable if the population is too common and the category can be found all over the world (Alvi, 2016). Table 2 below gives us the advantages and disadvantages of this sampling technique:

Advantages	Disadvantages
Systematic errors are reduced	The technique requires a lot of effort
Sampling biases are minimised	Technique is time-consuming
It generates a better representative sample	Technique is expensive

Table 2: Probability Sampling Method - Advantages and Disadvantages

Non-Probability Sampling Methods

 Alvi (2016) classifies non-probability sampling as non-random sampling. With this technique, the probability of participating in the study is not the same for every unit of the population. The researcher does not make any random selection of the sample. The researcher makes the selection of the sample based on their subjective judgment. The population does not have to be defined precisely for this technique. Non-probability techniques enable researchers to use samples with elements of a population that are infinite. The techniques can be used for a population that is too common and for a population that is accurately defined (Alvi, 2016). The advantages and disadvantages of the technique are listed in table 3 below:

Advantages	Disadvantages
The technique does not require much effort	Prone to systematic errors
The technique does not require a lot of time to complete	Not a good technique for a good representation of a population
The technique is not expensive	Inferences not generalisable to the population

Table 3: Non-Probability Sampling Method - Advantages and Disadvantages

Table 4 lists the types of probability sampling methods as well as the characteristics of each method as indicated by Alvi (2016); Oates (2005):

Method	Characteristics
Simple Random Sampling	• Each group/element of the population has an equal chance of being part of the sample • A fixed number of elements that can be recorded/plotted is required • Mutually exclusive elements with no intersecting characteristics • The population must be homogenous
Systematic Random Sampling	• No equal chance of elements being selected to be part of the sample • Elements are chosen at regular intervals (in terms of order, space, and time) • The listing of elements may or may not be required during the research process • Not always possible to create a list of elements before the research process

Method	Characteristics
	• The population must be homogenous
Stratified Random Sampling	• Population is heterogeneous • Element's characteristics differ from one another • Homogenous subgroups (strata/single stratum) are formed • Gender, ethnicity, age, and socioeconomic status are used for stratification • A random stratum is selected to form a sample
Cluster Sampling	• Used when elements are scattered through an extensive geographic region • The population is separated into clusters based on the location • Clusters must be homogenous
Multistage Sampling	• Two or more probability techniques are joined • Used when the elements are scattered over an extensive geographic area • Several stages of sampling are done to get to the final sample

Table 4: Types of Probability Sampling

Table 5 lists the types of non-probability sampling methods as well as the characteristics of each method as indicated by Alvi (2016); Oates (2005):

Method	Characteristics
Volunteer sampling	- The sample is self-selected - Participants approach the research to be part of the study - Participants get to know about the study through announcements and advertisements
Convenient sampling	- Sampling is accidental or happens when an opportunity arises - The researcher uses participants that are convenient to approach - Useful when the target population is broad
Purposive sampling	- The technique is not mutually exclusive - The sample is selected with a purpose in mind - Criteria of elements are predefined - Only include those that meet the predefined criteria, not everyone available
Quota sampling	- The population must be heterogeneous - Elements will differ in terms of characteristics - Homogenous subgroups formed - Quota criteria used can be age, gender, ethnicity, and socioeconomic status - Participants are selected randomly from each homogeneous sub-group

Method	Characteristics
	using a fixed quota
Snowball sampling	• This is chain sampling • An element of a population refers to other elements to the researcher
Matched Sampling	• Used in experimental research • The effects of an intervention are assessed through a control group selected
Genealogy Based Sampling	• Used primarily in rural areas to form samples • It gives a realistic view of the community grouped by sex and age.

Table 5: Types of Non-probability Sampling

Based on the discussion above, this study used the probability sampling technique as the purpose was to develop an understanding of the population. This was also dependent on the availability of factors such as time and costs as well as the efforts of conducting the sampling. The targeted population was only workers who work in the organisation under study; therefore, the researcher used simple random sampling as the population is homogenous, and a comprehensive list of elements could be readily prepared (Alvi, 2016).

3.3.3   Sample size

Since this is a smaller scale project, the size of the sample was limited to 30 participants with a target population of 35 to generate a confidence level percentage of 95 with an accuracy level of +-3%. The researcher understood that the sample size could not be less than 30 participants in order to use statistical analysis (Oates, 2005). Therefore, the qualitative analysis done was simply to compare phenomena. The researcher only managed to secure 20 participants in this study and this number was determined to be sufficient. Based on the research done by Guest, Bunce and Johnson (2006), data saturation had occurred for the most part around the time they had examined 12

interviews. They generated 92% of the overall number of codes developed after 12 interviews. Their findings also revealed that after analysing 12 interviews, new themes arose infrequently and gradually as the study progressed.

3.4   DATA COLLECTION

In this study, data was collected using the survey research strategy in the form of closed-ended and open-ended questions through the following data generation technique:

- Questionnaires – The researcher placed the questionnaire within an email as an attachment to the participants (Oates, 2005).

3.4.1   Survey Strategy

Survey via questionnaires

A questionnaire was created based on pre-defined questions assembled in a pre-determined order. The respondents answered the questions, and the responses were used to analyse and look for patterns to generalise.

These questionnaires were self-administered; that is, the participants completed the questions in the absence of the researcher. All the questions depicted in the questionnaire were:

- Brief – with only 20 words or less.
- Validity – questions were aligned to the purpose of the questionnaires.
- Unambiguous – words with multiple meanings were not used.
- Specific – vague questions did not form part of the questionnaire.
- Objective – the questions did not suggest that the answer is already known nor lead the respondent to answer in a specific way.

The questions that were in the questionnaire generated both factual and opinion data. The questionnaire was divided into open-ended and closed-ended questions. The survey questionnaire was sent by email to 50 participants, and 20 participants responded. As a result, 20 survey samples were collected. The primary data collected from the fieldwork was used for the data analysis.

Question Design and response format

- The researcher used statement answer format questions (open-ended questions)
- The researcher used the Likert scale format questions (five-point scale) – These were divided into three categories taken from the TOE Framework that is: Organisational Setting, Environmental Setting, and Technological Setting. Refer to Appendix A for the complete questionnaire used in the survey.

Layout and structure

The questionnaire had a section that introduced the purpose of the research, the researcher, as well as the return email address and date on which it should be sent back to the researcher. There was also a section that explained that the answers were confidential, and completion was voluntary. The researcher had a section where respondents were recognised for participating in the research. There was a section that provided clear instructions on how to complete the questionnaire. Finally, the look and feel of the questionnaire was attractive and had a clear layout and good font and size (Oates, 2005). Refer to Appendix A for the questionnaire.

3.4.2   Measurement

A five-point Likert scale was used for some of the questions in the questionnaire. The scale had the following responses:
- Agree
- Strongly Agree
- Neither agree nor disagree
- Disagree

- Strongly Disagree

Open-ended questions were also used in this study, where respondents could answer with any statement without any limits (Oates, 2005).

3.4.3   Pre-testing

Questionnaires were evaluated before being used through a pre-test. This was done by showing the contents of the questionnaire to experts in the research domain. It was also piloted on a group of people who were selected to check if people would encounter difficulties while answering questions, or to check if questions were ambiguous or if the responses covered all desired answers amongst others (Oates, 2005). There were no corrections of questions requested after the evaluation by the group of pilot people selected.

3.5   DATA ANALYSIS

3.5.1   Quantitative Data Analysis

As indicated in the data collection section, data was collected via a questionnaire that had 5-point Likert scale questions as well as questions in an open-ended format. Responses were collected from respondents/participants in the following areas, categorized by participant's role: management, support, and core business. Figure 10 shows that management was responsible for 40% of the responses. The lowest response rate (15%) was for roles in core business and support.
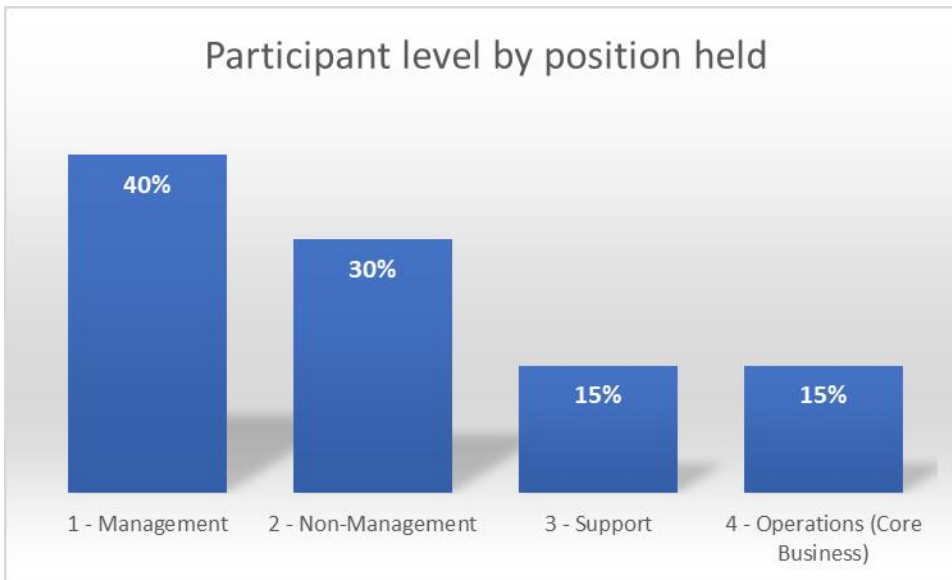
Figure 10: Responses by Role of Respondent

The responses were also categorized based on the level of the position. Middle management (professionally qualified and experienced specialists) accounted for half of the responses, while junior management (skilled technical and academically qualified) accounted for half of the responses. Only 5% of top management (executive management) responded. See Figure 11.
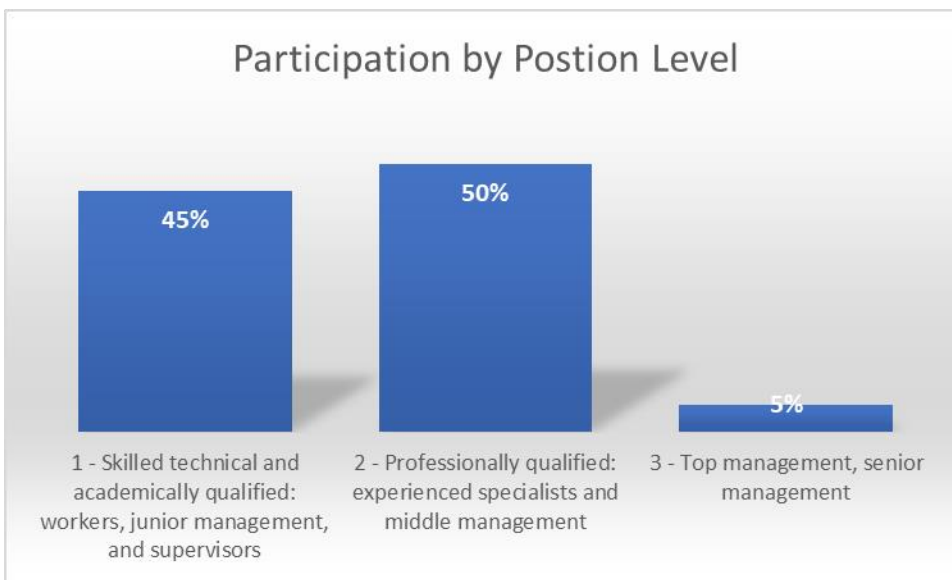
Figure 11: Responses by Position Level

The Likert scale questions from the questionnaire were transcribed to Microsoft Excel and then formatted and prepared for analysis, refer to Appendix B. Analysis was done by calculating the percentages of how the respondents responded to the 5 Likert Scale questions (Agree, Disagree. Neither Agree nor Disagree, Strongly Agree and Strongly Disagree). The analysis for each question in the organisational setting category is depicted in Appendix D. The analysis for each question in the environmental setting category is depicted in Appendix E. The analysis of each question in the technological setting category is depicted in Appendix F.

3.5.2   Qualitative Data Analysis

Thematic Analysis was the methodology used for the data analysis in this study for the open-ended questions. Clarke and Braun (2014) define thematic analysis (TA) as a qualitative data analysis technique for locating, analysing and interpreting meaning patterns ('themes'). In qualitative analytic techniques, TA is unique in that it offers a methodology rather than a method – a tool or technique that is not restricted by theoretical commitments (a theoretically informed and confined framework for research). This does not mean, contrary to popular belief, that TA is not a theoretical, realist, or essentialist method. In contrast, TA can be used in a wide range of theoretical frameworks and research approaches. There are forms of TA designed for use within (post)positivist frameworks that emphasize the importance of coding reliability, and given the emphasis on positivism in positive psychology, it is logical that qualitative researchers embrace such approaches in this area (Terry, Hayfield, Clarke and Braun, 2017). It makes it efficient to generate codes and themes from qualitative data using a systematic approach. The smallest units of analysis are codes, which capture intriguing properties of the data that are (possibly) relevant to the study issue (Clarke and Braun, 2014).

Clarke and Braun (2014) argue that themes, or (bigger) patterns of meaning, are built on the foundation of codes, which are anchored by a primary organizing notion - a shared core idea. Themes give a structure for arranging and summarizing the analytic observations of the research process. TA's goal is to find and analyse key, but not necessarily all, aspects of the data, guided by the study topic. The emphasis is on providing thorough and high-quality analysis, and TA has quality procedures built-in, such

as multiple evaluation processes (where candidate themes are reviewed against the coded data and the entire dataset). TA can be used to evaluate large and small data sets, as well as homogeneous and heterogeneous samples, ranging from small case studies with 1–2 participants to extensive interview studies with 60 or more participants (Clarke and Braun, 2014). Finally, TA can be used for both inductive (data-driven) and deductive (theory-driven) analyses and for both explicit and implicit meaning capture (Joffe, 2012). This is not to say that TA is a one-size-fits-all approach to every qualitative research question or design (Clarke and Braun, 2014).

Phase One: Becoming familiar with the data

Reading and rereading textual data (e.g., replies to qualitative surveys) were all part of Phase one. This phase included taking notes on the data as the researcher reads. Potential items of interest were highlighted in this phase. The goal of this phase was to become thoroughly acquainted with the content of the data set and to start noticing things that were relevant to the research question. The researcher looked through the completed data collection at least once, if not twice or more, to develop confidence in their understanding of the data. The researcher made notes on both the whole data set and individual transcripts. At this point, note-taking was more observational and casual than systematic and inclusive. Rather than polished text, notes are usually a stream of consciousness, a jumble of ideas (Clarke and Braun, 2014). Refer to Appendix G for a complete list of the answers received from the participants for each question.

Phase Two: Generating Initial Codes

Phase 2 focused on the coding-based systematic analysis of the data. The building blocks of analysis are codes. Codes are used to identify and label a feature of the data that may be important to the research question. Codes give a quick overview of a piece of data or characterize its substance; such descriptive or semantic codes are usually near to the data's content and the participants' meanings. Codes also provide an understanding of the data content beyond the meanings of the participants. Such interpretative or latent codes reveal meanings hidden under the data's semantic surface. Some codes use the same language and concepts as the participants, while others use the researchers' conceptual

and theoretical frameworks. Codes are shorthand for something the analyst understands; they do not need to be fully fleshed-out explanations; those come later. Almost all codes will be a combination of descriptive and interpretive. Arguably, the most important aspect to remember about all the codes is that they are all related to addressing the research topic. The way data is segmented and coded is not dictated by TA (e.g., the researcher does not have to produce a code for every transcript line) (Clarke and Braun, 2014).

Large or small pieces were coded, and some parts were not coded at all. The researcher wrote down the codes and marked the text linked with the codes identified in the data extract. More than one code was used to code a section of data. The coding done was comprehensive, thorough, and methodical. The researcher continued reading the data after they had generated their first code until they found the following potentially relevant extract. This technique was repeated for each data item and the whole data set. It was essential to recode and recode previously coded data. This stage of the TA process was completed after the data was thoroughly coded. The researcher needed enough codes to capture both the diversity and the patterns in the data (Clarke and Braun, 2014).

Atlas.ti was used to code this project. The keywords of the transcripts were determined using Atlas.ti's word cruncher feature before coding. Figure 12 shows the words mentioned 15 times or more in the survey's open-ended questions. Refer to Appendix H for the word cloud generated in Atlas.ti. The following keywords had the highest frequency, ERP, organisations, systems, and adoption. Themes in data-focused coding are based on the data, but in theory-focused coding, the methodology is based on well-defined topics to code around. The method used was a combination of theory-driven coding based on the TOE framework and data-driven coding. Furthermore, rather than coding on a possibly limited data set, the coding was done on the complete data set's content (Clarke and Braun, 2014).
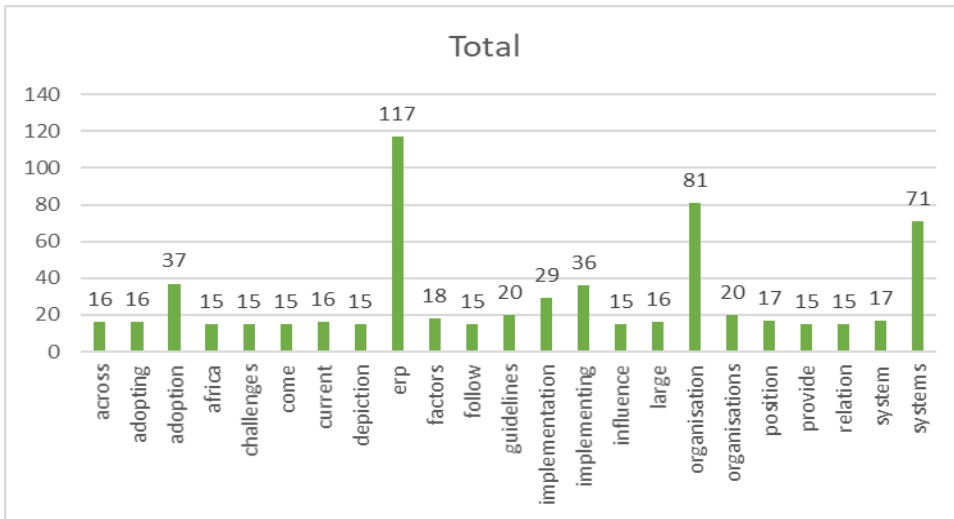
Figure 12: Words that appeared more than 15 times

Having read and analysed the responses to the open-ended questions and the material gained from the literature study to address the research question, a total of 103 initial codes were developed. (See Table 6):

	Code			Code
1	Adopt new ways of working		21	End-user
2	All modules are being used		22	End-user involvement
3	Budget		23	End-user not involved
4	Business complexity		24	End-user specialised knowledge
5	Central view of data		25	Ensure successful Implementation
6	The centrality of organisational Data		26	ERP adoption is rapid
7	Challenges with ERP Implementation		27	ERP implementation has met the requirements
8	Change management		28	ERP security
9	Contracting necessary		29	ERP system complexity
10	Cost		30	ERP system is adopted
11	The current state of adoption		31	ERP system is functional
12	Customisation of the ERP system		32	Factors that influence adoption
13	Delays and cost overruns		33	Features are not adequate for organisations' needs
14	Departs from guidelines provided by the vendor		34	Fit the culture of the organisation
15	Digitisation		35	Framework be built and adopted
16	Discard guidelines when implementing		36	Governance processes
17	Ease of Maintenance		37	Guided by industry-wide principles of implementing solutions
18	Ease of use		38	Guidelines when adopting and implementing ERP systems
19	Easy to access information		39	Guidelines from Gartner
20	End-to-end processing of transactions		40	High adoption rate

	Code			Code
41	High levels of customisation		63	Implementation took long
42	Implementation of ERP modules that are not necessary		64	Improved turn-around time
43	Share knowledge and understanding of common goals		65	Inadequate flexibility
44	Single platform		66	Inept following of SDLC
45	Size		67	Interested stakeholder
46	Skills to maintain and innovate ERP Platform		68	System Integration
47	Stable and gradual growth		69	Internal technical resources availability
48	Strategic intent not clearly articulated		70	Lack of adoption from users due to preferences from other organisations
49	Streamline organisational processes		71	Lack of adoption of standard processes
50	Structure		72	Lack of appetite to adopt
51	Technical role		73	Lack of collaboration
52	Technical Skills of resources		74	Lack of support from the vendor
53	Technical testing for all ERP system		75	Large organisations
54	Testing ERP Solutions		76	Low adoption of ERP
55	Timelines		77	Maintenance costs
56	Top management support		78	Mature
57	Training		79	Merge programs into one
58	Unsure		80	Modules available in ERP implemented outside the ERP system
59	User requirements delayed implementation		81	No clear expectations and metrics to evaluate success or failure
60	Visibility on all stages of the workflow		82	Not implementing best-recommended practices
61	Willingness to change		83	Not properly vetting vendors
62	Working according to organisation requirements		84	Oracle

	Code
85	Oracle needs enhancement
86	Organisational functions
87	Organisations are different
88	Passed quality gates
89	People adoption of the system
90	The platform is well supported
91	Poor adoption of the system
92	Poorly planned projects
93	Position in ERP Implementation
94	Program/Project planning
95	Project Management office not implementing correctly/too quickly
96	Proper QA of ERP
97	Quality Management
98	Recovery testing
99	Regular use of ERP system
100	Resistance to change
101	Run banking, Pension, and Payroll
102	Selecting the right ERP solution
103	Service Delivery

Table 6: Initial Codes

Phase Three: Searching for Themes

As the process moved from codes to themes, the analysis began to take shape. A theme represents some level of structured response or meaning within the data set and captures an important characteristic of the data in relation to the research problem. The process of looking for themes is active because themes are created or constructed rather than discovered. This phase entailed going over the coded data and looking for areas of overlap and resemblance. The primary method of creating themes and subthemes, which are subcomponents of a theme, entailed compressing or grouping codes that shared some common traits so that they reflected and depicted cohesive and relevant patterns in the data to deliver a coherent story about what was happening in the data. Various themes, which incorporated all the codes that did not seem to fit any place, were discarded. It is vital for qualitative analysis to let go of coded information and even provisional themes if they do not fit in the overall analysis. This phase was concluded with a thematic map and

table describing the possible topics discussed in chapters 4 and 5 and a collection of all data extracts related to each subject (Clarke and Braun, 2014).

The initial codes were further analysed using both excel and Atlas.ti and resulted in some codes being deleted as they were not fit for the purpose of the research question. Some codes were merged with others, while some were renamed for the themes to be determined. Figure 13 shows the initial network of codes. A total of 57 codes remained after the analysis that was then used to structure the themes and sub-themes. Table 7 shows the table of main themes derived from the initial codes. The final thematic map or framework is depicted in Figure 14.
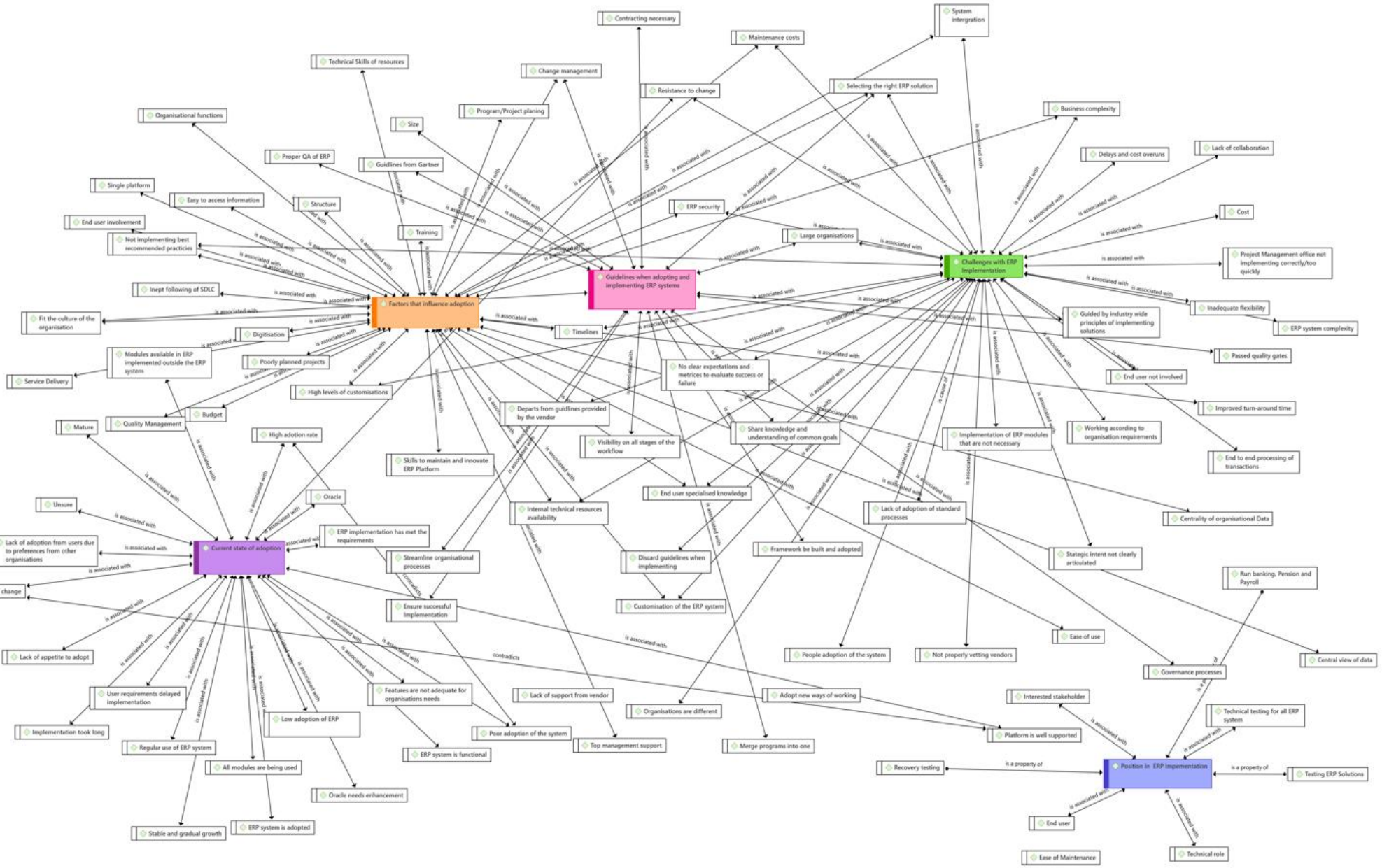
Figure 13: Initial Network of codes

Phase 4: Reviewing Potential Themes

The evolving themes were reviewed with the coded data and the complete data set in this phase, which is a cyclical process. This phase mainly was concerned with quality assurance. The first step was to cross-reference the themes with the data extracts and determine whether they worked together. The researcher needed to remove some codes or move them to another theme to capture the essential data more meaningfully. The following are some key questions considered:

- Is this a theme (or simply a piece of code)?
- What is the theme's quality (does it teach me anything relevant about the data collection and my research issue) if it is a theme?
- What does this theme's scope (what does it cover and exclude)?
- Is there sufficient (valuable) data to support this theme (is it thin or thick)?
- Is the evidence too varied and broad in scope (does the theme lack coherence)?

The next step in the review process was to review the themes for the entire data set. This entailed a last reread of all the data to see if the themes accurately represent the complete data set or a subset of it. The goal was to create a set of themes that capture the most essential and relevant aspects of the data and the data's overall tone in relation to the research question (Braun and Clarke, 2012).

Phase 5: Defining and Naming Themes

According to Braun and Clarke (2012), when establishing themes, the researcher must express clearly what is distinctive and specific about each topic - a fair test of this is whether the substance of each theme can be summed up in a few phrases. A solid thematic analysis will include themes that (a) do not try to do too much, as themes should ideally have a single focus; (b) are connected but do not overlap, so they are not repetitive, though they may build on earlier themes; and (c) explicitly answer your research issue (Braun and Clarke, 2012).

The researcher went through all the data gathered and then started to identify the key themes that emerged in the data. The researcher used an excel spreadsheet and created a table where each segment of the data was categorized into a heading or subheading that described the theme represented by the unit of data. The categories came from existing theories that were identified through the literature review, as well as categories that were identified in the data during the data collection phase. The researcher kept examining and reading the material gathered and refined categories, breaking them down into subcategories. The researcher checked themes for connections and patterns between segments. Based on the patterns the researcher observed, a theory about what the data showed emerged. This theory was linked to the original TOE conceptual framework that was selected for the study. The emerging theory was then tested by looking at any evidence from the data that is contradictory in Chapter 5. The researcher searched for all alternative explanations for the proposed explanation (Oates, 2005).

Sub-themes within a theme are useful in some situations. These themes are beneficial when there are one or two overarching patterns in the data that are relevant to the question, but each is expressed in a variety of ways. This phase entailed picking and analysing extracts before laying out the story of each subject using these extracts. Another component of this process was deciding on a name for each theme. An excellent theme name is informative, simple, and memorable (Braun and Clarke, 2012). Chapter 4 contains the themes and subthemes that emerged from the data during the analysis. These were discussed in detail in chapter 4.

Phase 6: Producing the Report

The report's goal is to tell a captivating story about the facts that are based on the analysis. The story should be convincing and straightforward but also grounded in academic research (Braun and Clarke, 2012). The report of findings will be discussed in chapter 4.

3.6 ETHICS

According to a study done by (Ryen, 2016), the following is a summary of ethical considerations in IS research:

- Trust
- Confidentiality
- Codes and consent

Oates (2005) identified the following ethical considerations:

- Right not to participate.
- Right to withdraw.
- Right to give informed consent.
- Right to anonymity.
- Right to confidentiality.

Some of the ethical considerations will be discussed below.

Trust refers to the relations between the research participants and the researcher. The researcher has a responsibility not to tarnish the field of study for others by doing things that render them untrustworthy to the research community and the public. The researcher also has a responsibility to report their work as trustworthy. Trust is the classic key to good field relations that will ensure that potential research subjects will continue to support other researchers' work in the future. Confidentiality refers to the fact that the researcher is obliged to protect each research subject's identity and location. Some participants do not necessarily want to be treated as anonymous; however, consent must be given before any of the information is revealed. Codes and consent refer to informed consent; that is, the participant has a right to know that they are being researched. Participants have a right to be informed concerning the nature of the research. Participants also have a right to withdraw at any given time when they no longer feel comfortable. A signed consent form is mandatory in some countries. In some instances, the researcher must follow lengthy and special procedures to get approval for theoretical samples as well as to get permission to contact potential research subjects. It is also important to note that ethical guidelines are not universal. We can, therefore, never assume that the same guild lines used by a country will be the same as those used in another country. Therefore, if research is to be

done in another country other than your own, the researcher is then obliged to seek out the ethical guidelines used in that country. The researcher can then combine the guidelines in the country of research and the country in which they reside (Ryen, 2016).

While completing this dissertation, the ethical consideration outlined above were considered in choosing the appropriate research design and data collection strategy. The researcher ensured that no person was harmed in any way by participating in this study. The participants were, therefore, safe at all times. Research subjects were also allowed to withdraw from participating in any event where they became uncomfortable. Immoral behaviours such as not disclosing agreements, not keeping the participants' identity confidential as promised, avoiding legal accountability when it arises, incorrect reporting of findings, and misleading participants were not allowed in this study. Permission from all participants was obtained before the completion of this research. An online ethical clearance request was requested and subsequently approved with a certificate issued (Oates, 2005; Ryen, 2016).

3.7 CONCLUSION

The researcher selected the survey strategy for this study, where the interpretive paradigm was used to assist in gaining an understanding of the phenomenon under study. The TOE framework was selected as the theory that guided the study in terms of data gathering and understanding of the data collected. For this study, the researcher selected a sample from a homogenous population, that is, employees who meet the criteria of the elements determined. A probability sampling technique (simple random method) was used to assist the researcher in understanding the population. Probability sampling is more designed for studies that have an intention to develop an understanding of a given population (Alvi, 2016). The sample size was limited to 20 participants as a study by Guest et al. (2006), revealed that data saturation occurred after analysing 12 interviews, that is, new themes arose infrequently as the study progressed.

Mixed methodology research was selected for the data collection and analysis. The focus was, however, on the qualitative methodology, and the quantitative methodology was used to supplement the qualitative analysis. The qualitative and quantitative data were collected

using questionnaires, and this was discussed in the data collection section of this chapter. The Likert scale was used and limited to 5 points for some of the questions in the questionnaire. A pre-test was conducted, and that is discussed in detail in the same section of this chapter. Quantitative data were analysed using Excel, while qualitative data were analysed by identifying themes (thematic analysis) in the data gathered and the literature review, which is also discussed in detail in this chapter. Finally, the chapter discussed the ethical considerations that were practised in this study.

4 ANALYSIS OF FINDINGS

4.1 INTRODUCTION

The qualitative dominating (QAUL+quan) mixed research technique was used in this study; thus, the qualitative data analysis would be the main focus of the discussion of the findings. The quantitative data was analysed in Microsoft Excel, and the results were utilised to enhance the qualitative data analysis conclusions. As mentioned in Chapter 3, the qualitative data was analysed using Thematic Analysis (TA). During the thematic analysis, the following four main themes were discovered:

- The current state of implementation.
- Factors that can impede/restrict a fully integrated ERP system.
- Factors contributing to the successful implementation/adoption of ERP systems.
- Framework or guidelines to improve the integration of a successful ERP system.

4.2 FINDINGS AND ANALYSIS

The data was examined using Clarke and Braun (2014) methodology. The methodology has six phases, as discussed in Chapter 3. There was a total of 103 initial codes extracted while analysing the data generated from the open-ended questions in Atlas.ti. A total of 57 codes were chosen after constant comparison and merging of comparable codes and the rejection of several codes that were thought to be unnecessary to the study's goal. The chosen codes and the topics that arose from them are included in Table 7 below. The final thematic map is depicted in Figure 14.

Number	Code	Theme	Number	Code	Theme
1	All modules are being used	**The current state of implementation**	14	ERP system complexity	**Factors that can impede/restrict a fully integrated ERP system**
2	Budget	**Factors that can impede/restrict a fully integrated ERP system**	15	ERP system is adopted	**The current state of implementation**
3	Business complexity	**Factors that can impede/restrict a fully integrated ERP system**	16	ERP system is functional	**The current state of implementation**
4	Effective change management policies	**Factors contributing to the successful implementation/adoption of ERP systems**	17	Features are not adequate for organisations' needs	**The current state of implementation**
5	Contracting necessary	**Factors contributing to the successful implementation/adoption of ERP systems**	18	Fit the culture of the organisation	**Factors contributing to the successful implementation/adoption of ERP systems**
6	Implementation delays and cost overruns	**Factors that can impede/restrict a fully integrated ERP system**	19	Framework be built and adopted	**Framework or guidelines to improve the integration of a successful ERP system**
7	Follow ERP Implementation Guidelines from the vendor	**Framework or guidelines to improve the integration of a successful ERP system**	20	Selecting the right ERP solution	**Factors that can impede/restrict a fully integrated ERP system**
8	Ease of use and maintenance	**Factors contributing to the successful implementation/adoption of ERP systems**	21	Governance processes	**Framework or guidelines to improve the integration of a successful ERP system**
9	Integration of systems and functions across the organisation to provide one central view of data	**Factors contributing to the successful implementation/adoption of ERP systems**	22	Guided by industry-wide principles of implementing solutions	**Framework or guidelines to improve the integration of a successful ERP system**
10	End-user involvement	**Factors contributing to the successful implementation/adoption of ERP systems**	23	Guidelines from Gartner	**Framework or guidelines to improve the integration of a successful ERP system**
11	End-user specialised knowledge	**Factors contributing to the successful implementation/adoption of ERP systems**	24	High adoption rate	**The current state of implementation**
12	ERP adoption is rapid	**The current state of implementation**	25	High levels of customisation	**Factors that can impede/restrict a fully integrated ERP system**
13	ERP implementation meets organisational requirements	**Factors contributing to the successful implementation/adoption of ERP systems**	26	Implementation of ERP modules that are not necessary	**Factors that can impede/restrict a fully integrated ERP system**

Number	Code	Theme	Number	Code	Theme
27	Size of the project not taken into account during planning	**Factors that can impede/restrict a fully integrated ERP system**	37	Willingness to change	**Factors contributing to the successful implementation/adoption of ERP systems**
28	Stable and gradual growth	**The current state of implementation**	38	Resistance to change	**Factors that can impede/restrict a fully integrated ERP system**
29	Strategic intent not clearly articulated	**Factors that can impede/restrict a fully integrated ERP system**	39	Implementation took long	**The current state of implementation**
30	Organisational Structure	**Factors that can impede/restrict a fully integrated ERP system**	40	Inadequate flexibility	**Factors that can impede/restrict a fully integrated ERP system**
31	Unrealistic timelines for Implementation	**Factors that can impede/restrict a fully integrated ERP system**	41	Inept following of SDLC	**Factors contributing to the successful implementation/adoption of ERP systems**
32	Top management support	**Factors contributing to the successful implementation/adoption of ERP systems**	42	Internal technical resources availability	**Factors contributing to the successful implementation/adoption of ERP systems**
33	ERP training before and post-implementation	**Factors contributing to the successful implementation/adoption of ERP systems**	43	Lack of adoption from users due to preferences from another organisation	**The current state of implementation**
34	Unsure of the current state of implementation	**The current state of implementation**	44	Lack of collaboration	**Factors that can impede/restrict a fully integrated ERP system**
35	User requirements delayed implementation	**The current state of implementation**	45	Lack of support from the vendor	**Factors that can impede/restrict a fully integrated ERP system**
36	Visibility of activities at all stages of the workflow	**Factors contributing to the successful implementation/adoption of ERP systems**	46	Maintenance costs	**Factors that can impede/restrict a fully integrated ERP system**

Number	Code	Theme
47	The system maturity score is good	**The current state of implementation**
48	Modules available in ERP implemented outside the ERP system	**The current state of implementation**
49	No clear expectations and metrics to evaluate success or failure	**Factors that can impede/restrict a fully integrated ERP system**
50	Not implementing best-recommended practices	**Factors that can impede/restrict a fully integrated ERP system**
51	Not properly vetting vendors	**Factors that can impede/restrict a fully integrated ERP system**
52	ERP system needs enhancement	**The current state of implementation**
53	Passes quality gates	**Factors contributing to the successful implementation/adoption of ERP systems**
54	People's adoption of the system	**Factors contributing to the successful implementation/adoption of ERP systems**
55	The platform is well supported	**The current state of implementation**
56	Poorly planned projects	**Factors that can impede/restrict a fully integrated ERP system**
57	Proper planning of the project	**Factors contributing to the successful implementation/adoption of ERP systems**

Table 7: Final codes with associated themes
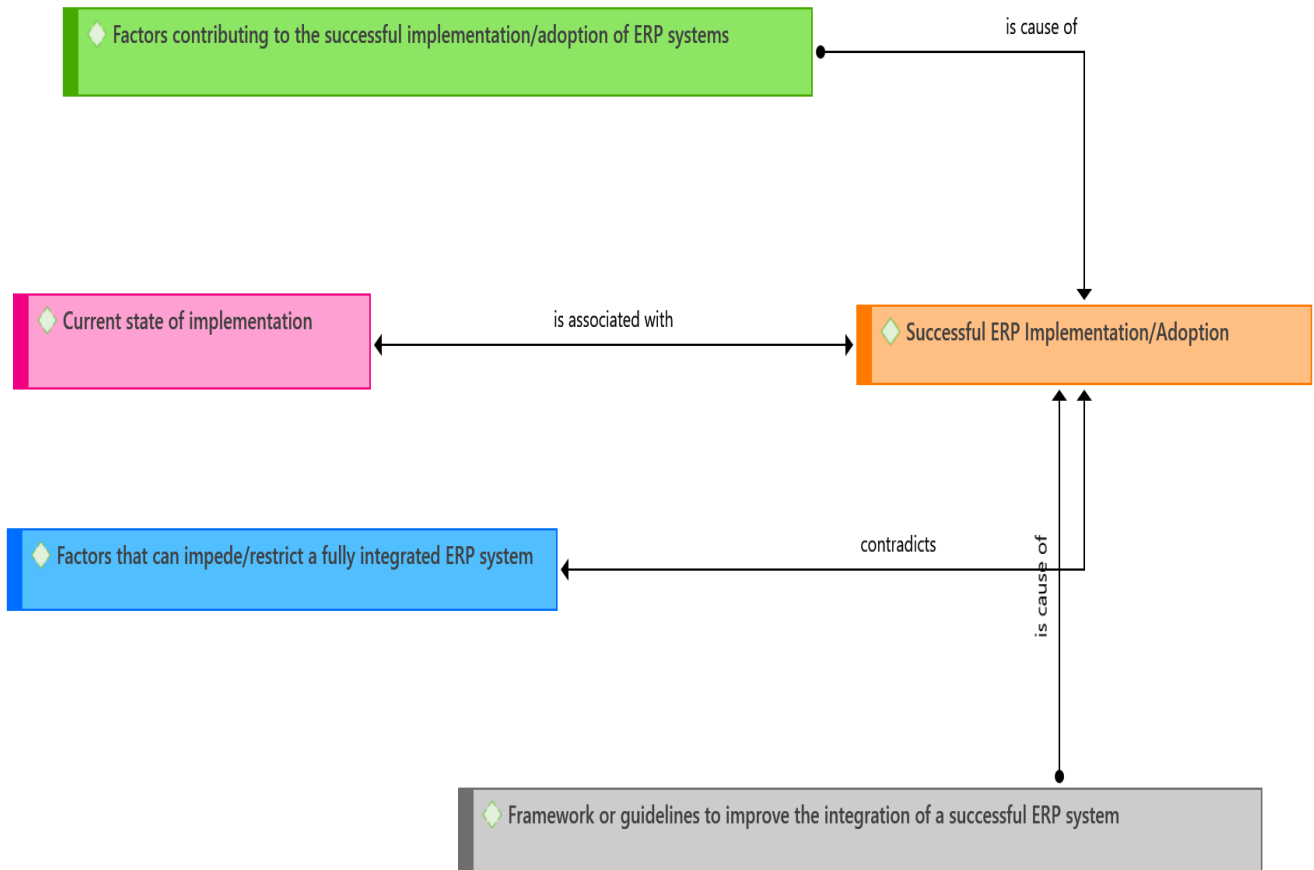
Figure 14: Final Thematic Map

Each of the four themes developed is discussed in more detail below.

4.2.1   The current state of adoption

There was widespread consensus that the ERP system in the organisation under investigation had not been extensively adopted. Some individuals thought the present adoption was good. The majority of the participants, however, did not share this opinion. In terms of adoption, the factors depicted in Figure 15 were identified.
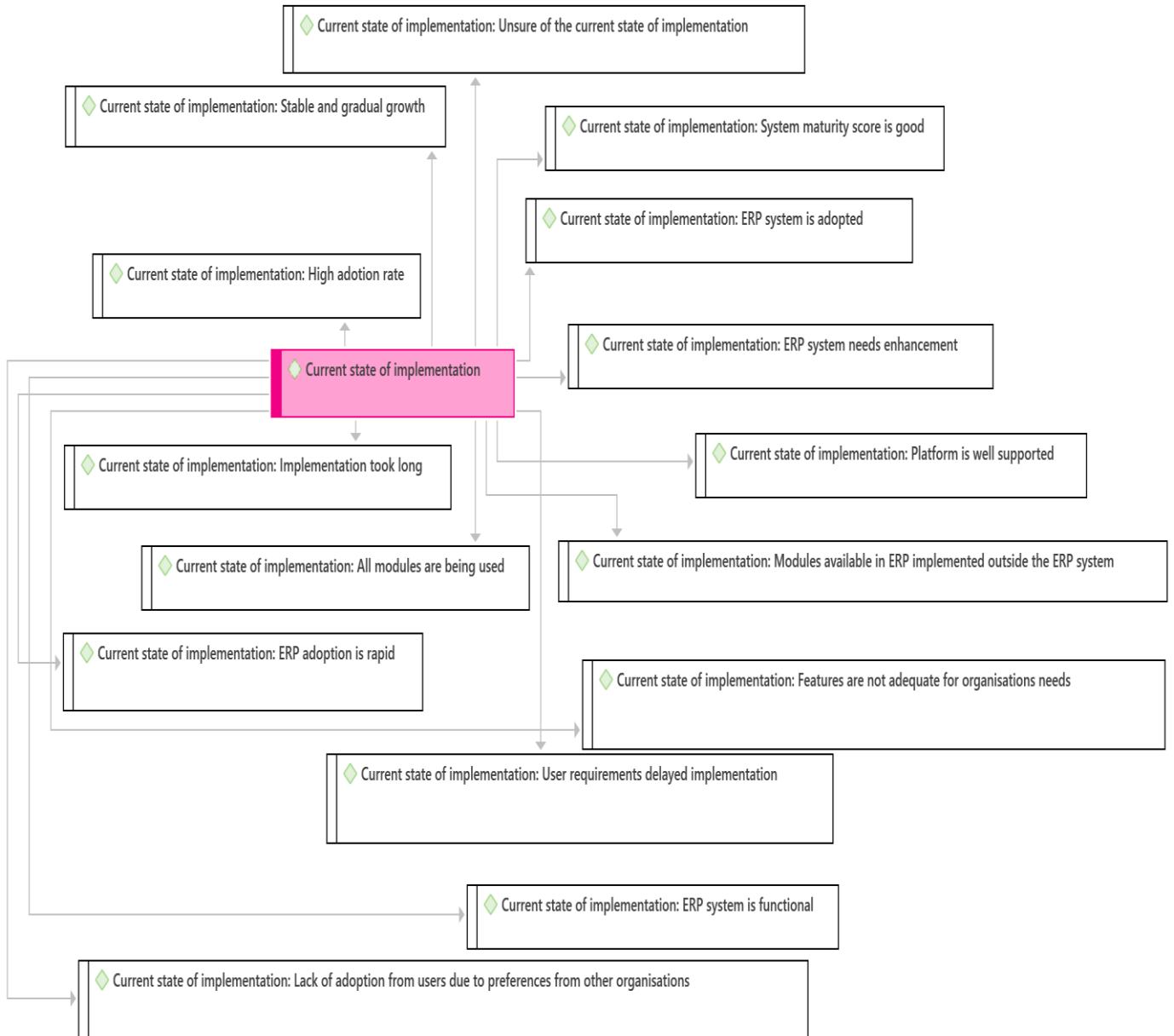
Figure 15: Current state of implementation

The participants explained the present state of implementation in the organisation under study. Some of the positive explanations made regarding the current stage of adoption/implementation were as follows:

- ERP system is adopted.

  "*In the current organisation ERP system is adopted, and all the modules are being used*" P9.

- Gradual and stable growth.

- High adoption rate.

- The platform is well supported.

  "*I think we have a high adoption rate at the moment as the platform is supported well*" P17.

- The organisation and system maturity scores are good.

- All modules are being used.

Some participants, on the other hand, offered different justifications, implying that the current status of adoption in the organisation is not adequate. A few of the explanations are listed below:

- ERP system needs enhancement.

  "*We have Oracle, which looks like it needs enhancing due to features that are not adequate*" P18.

- Modules that are part of the ERP solution are implemented independently of the system.

- Implementation was delayed due to missing requirements.

- Lack of adoption from users due to a preference of other organisations.

  "*Lack of adoption because users tend to have specific preferences especially based on their previous experience at other organisations, e.g., SAP vs Oracle*" P15.

50% of the participants agreed that implementation projects are managed effectively and that they are easy to use. Refer to Appendix F.

4.2.2 Factors that can impede/restrict a fully integrated ERP system

Participants highlighted the following characteristics in Figure 16 as significant obstacles to a fully integrated ERP system.

Figure 16: Factors that can impede/restrict a fully integrated ERP system

The factors are listed below:

- ERP system complexity.

  "Ease of use, some ERPs are too complex for end-users" P14.

  According to the survey results in Appendix F, 50% of the participants agreed that the ERP system in the organisation is efficient and easy to use, whereas 25% of the participants disagreed with this statement. Overall, 45% of the participants agreed that the organisation's ERP system is well integrated and streamlined where possible. 25% of the participants disagreed with this statement.

- High levels of customisation.

  "Lack of appetite to adopt out-of-the-box standard processes. High levels of customisation. Lack of adoption because users tend to have specific preferences especially based on their previous experience at other organisations, e.g., SAP vs Oracle. Not articulating the strategic intent of the implementation with clear expectations and metrics to evaluate success or failure. Poorly planned projects are resulting in delays and cost overruns" P15.

- Inadequate flexibility of ERP systems.

  "If an ERP system is not adequately flexible, the organisation may have to adjust its processes to suit the ERP for it to function. This may seem a little backward, and the time and resources it would take to reorganize the organisation and reskill the hesitant teams would not seem worth it. However, by choosing the right software for the organisation's specific requirements, integration would be seamless and thereby eliminate the lack of flexibility" P20.

- Budget.

  Some participants mentioned size and budget as some of the factors that can impede a fully integrated ERP system.

- "Maintenance costs".

  "All ERP systems require frequent maintenance, which generates maintenance costs. An ERP system might appear inexpensive to start with, but failure to factor in the maintenance costs attached to it before implementation can end up costing the organisation tremendous large amounts to pay. This is again another reason to properly vet your vendors prior to making a decision" P20.

- Implementation of ERP modules that are not necessary.

- Strategic intent not clearly articulated.

  According to the survey results in Appendix D, 50% of the participants agreed or strongly agreed that the organisation clearly communicates how its ERP implementation strategy will impact its operations and assist the organisation in achieving its objectives. The rest of the remaining 50% of participants either disagreed or neither agreed nor disagreed with this statement. 60% of the participants also agreed or strongly agreed that the organisation has a clear understanding of how ERP systems can enhance its competitive environment. Furthermore, 65% of the participants agreed or strongly agreed that the organisation clearly communicates their ERP system implementation strategy.

- Unrealistic timelines for implementation.

- Lack of support from the vendor.

  "When the team faces an issue and there is a vital milestone to meet, there is a lack of immediate response from the vendor" P13.

- Implementation delays and cost overruns.

- Business complexity.

  "One of the elements that may influence ERP system adoption is business complexity. Another two factors could be the structure as well as the organisation size" P9.

- No clear expectations and metrics to evaluate success or failure.

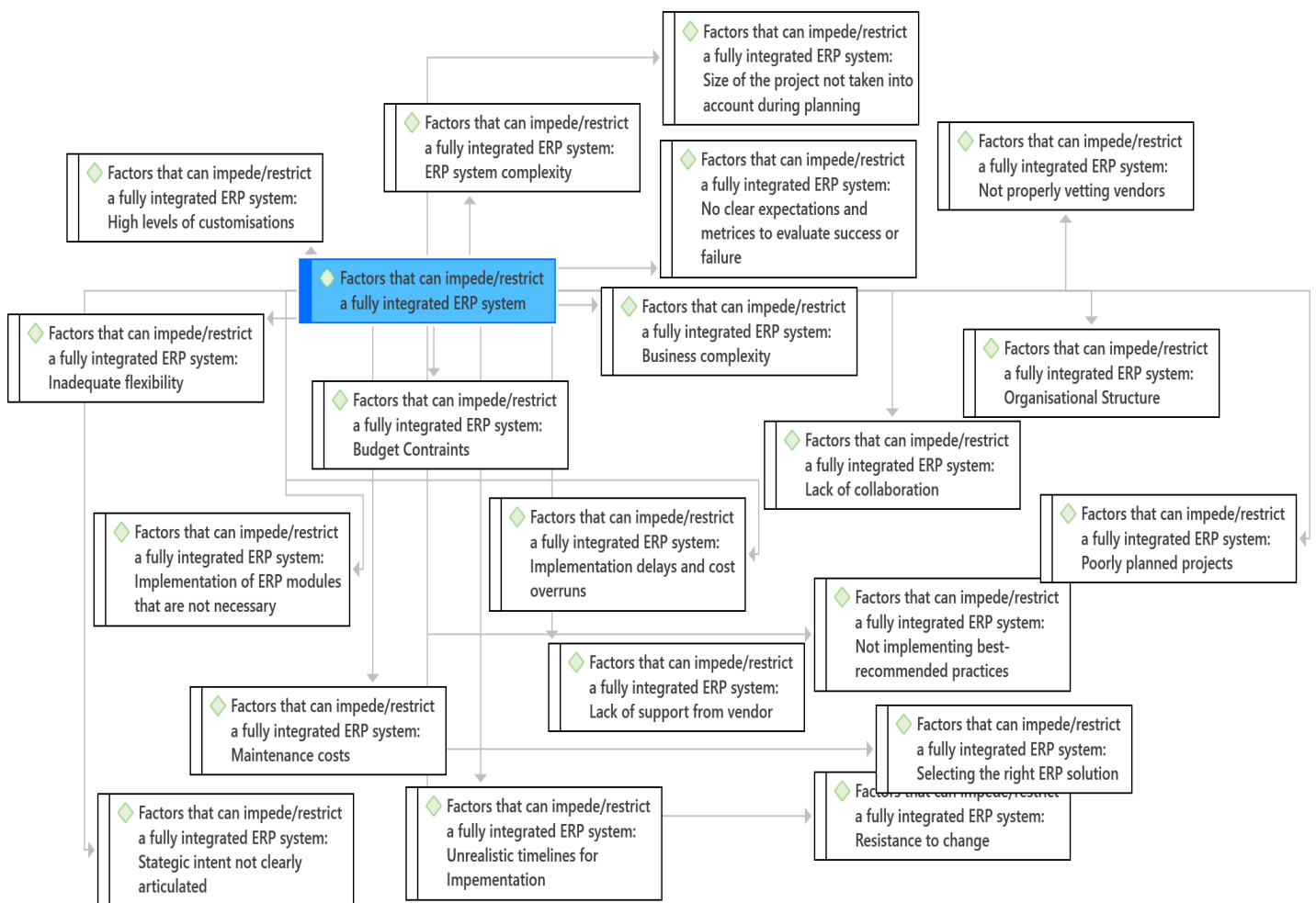 *"Lack of appetite to adopt out-of-the-box standard processes. High levels of customisation. Lack of adoption because users tend to have specific preferences especially based on their previous experience at other organisations, e.g., SAP vs Oracle. Not articulating the strategic intent of the implementation with clear expectations and metrics to evaluate success or failure. Poorly planned projects are resulting in delays and cost overruns"* P15.

- Lack of collaboration.

  "Program/project planning; "inept following of the SDLC"; a lack of internal technical resources to drive implementation; and a lack of communication across various implementation teams" P1.

- The size of the project was not considered during the planning.

- Not properly vetting vendors.

"All ERP systems need to be maintained on a regular basis, which results in maintenance costs. An ERP system might appear inexpensive to start with, but failure to factor in the maintenance costs attached to it before implementation can end up costing the organisation tremendous large amounts to pay. This is again another reason to properly vet your vendors prior to making a decision" P20.

- Organisational structure.

  25% of the participants agreed that the organisational culture supports new ways of working, such as ERP systems, for a more effective way of working, whereas 40% of the participants neither agreed nor disagreed with this statement. Refer to Appendix F for the survey results on organisational structure.

- Poorly planned projects.

  "Lack of appetite to adopt out-of-the-box standard processes. High levels of customisation. Lack of adoption because users tend to have specific preferences especially based on their previous experience at other organisations, e.g., SAP vs Oracle. Not articulating the strategic intent of the implementation with clear expectations and metrics to evaluate success or failure. Poorly planned projects are resulting in delays and cost overruns" P15.

- Selecting the right ERP solution.

  "Choosing the right ERP, as well as ensuring its security and quality assurance" P3.

- Resistance to change.

  "The organisation still has few people that are not interested in what the system has to offer, they still believe in their old ways of doing things" P7.

- Not implementing best-recommended practices.

4.2.3 Factors contributing to the successful implementation/adoption of ERP systems

Participants highlighted the following characteristics in Figure 17 as significant factors that contribute to a successful and fully integrated ERP system.
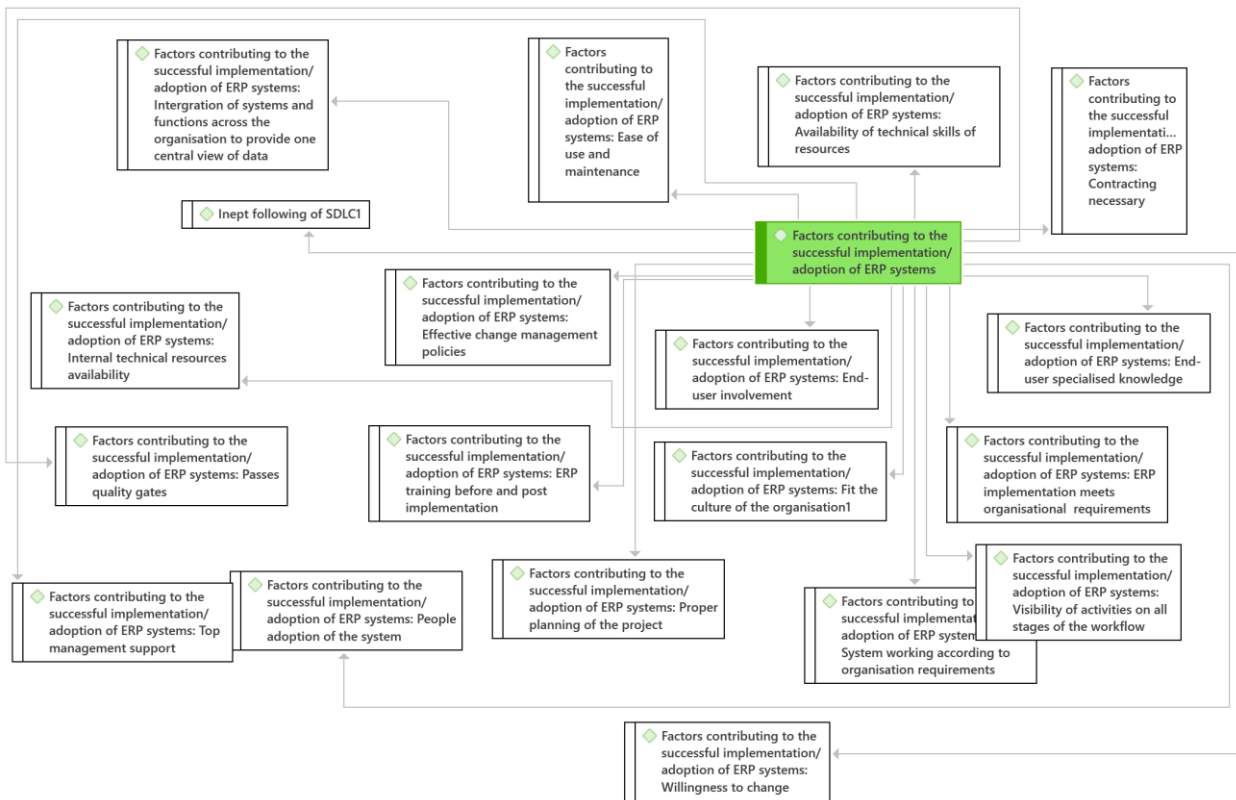
Figure 17: Factors contributing to the successful implementation/adoption of ERP systems

The factors are listed below:

- Effective change management policies.

  According to the survey results, only 35% of the participants agreed that there are effective change management policies in the organisation. 50% of the participants neither agreed nor disagreed. Refer to Appendix F.

- Contracting necessary.

  "Technological expertise was an issue, and we needed to get outside expertise to get us through" P5.

- Ease of use and maintenance.

  "Cost and ease of maintenance" P2.

- End-user specialised knowledge.

  "It requires special knowledge for the users of the system" P5.

  The survey results suggested that there are mixed feelings on whether the organisation has specialised knowledge and digital skill expertise to operate efficiently and effectively. According to the survey results in appendix D, only 35%

of the respondents either agreed or strongly agreed that the organisation does have the necessary expertise to carry on its technological duties. The rest of the participants either completely disagreed or neither agreed nor disagreed.

- ERP implementation meets organisational requirements.

"I am in a quality management area, and my position is to ensure the ERP implementations have met the required requirements and passed all the quality gates to ensure successful implementation" P9.

"The ERP system is now operational, despite the fact that it took a long time to be fully implemented and operational. Customisation and user requirements were some of the delaying factors in the Implementation" P14.

- Fit the culture of the organisation.

Participants mentioned organisational culture as an essential element in the adoption of an ERP system. According to the survey results in Appendix E, 50% of the participants agreed that people in the organisations share the same culture of working. 10% of the participants strongly agreed while the rest of the participants disagreed or neither agreed nor disagreed. Furthermore, 50% of the participants also agreed that culture is the way people do things in the organisation. 35% concur with this and strongly agreed, while the rest neither agreed nor disagreed.

- Top management support.

"User involvement, employees and/or user skilling (IT skills) and top Management support" P12.

"It is the prices, support, and availability skills to support the ERP system" P13.

According to the survey results in Appendix D, 80% of the participants agreed or strongly agreed that there is senior management support for the successful implementation of ERP systems to manage the organisation's transformation.

- ERP training before and post-implementation.

"Ease of use and training" P18.

According to the survey results in Appendix E, 65% of the participants agreed or strongly agreed that there is a solid commitment to the training and development of people when new ERP systems are introduced in the organisation.

- Visibility of activities at all stages of the workflow.

"There is a need to streamline organisational processes and connect many technologies into a single platform where transactions can be completed end to end

and all phases of the workflow can be monitored" P15. To support this statement, in the survey results in Appendix F, 60% of the participants agreed or strongly agreed that there are processes in place to help the organisation manage new ERP systems from development to launch. 50% also agreed that the organisation engages in effective re-engineering of business processes. However, more than 50% of the participants were unsure that the organisation has effective change management strategies.

- Willingness to change.

   "Governance processes. Willingness to change and to adopt new ways of working" P4.

   "The ERP systems have been well accepted in the organisation, and people use it regularly" P13.

- Inept following of the SDLC.

   "Program/project planning; "inept following of the SDLC"; a lack of internal technical resources to drive implementation; and a lack of communication across various implementation teams" P1.

- Internal technical resources availability.

   "It is the prices, support, and availability skills to support the ERP system" P13.

- Passes quality gates.

- People's adoption of the system.

- Proper planning of the project.

   60% of participants seem to think that there is proper planning of ERP implementation projects in the organisation. Refer to Appendix D.

4.2.4   Guidelines to improve the integration of a successful ERP system

Participants highlighted the following characteristics in Figure 18 as possible guidelines that can contribute to achieving a fully integrated ERP system.
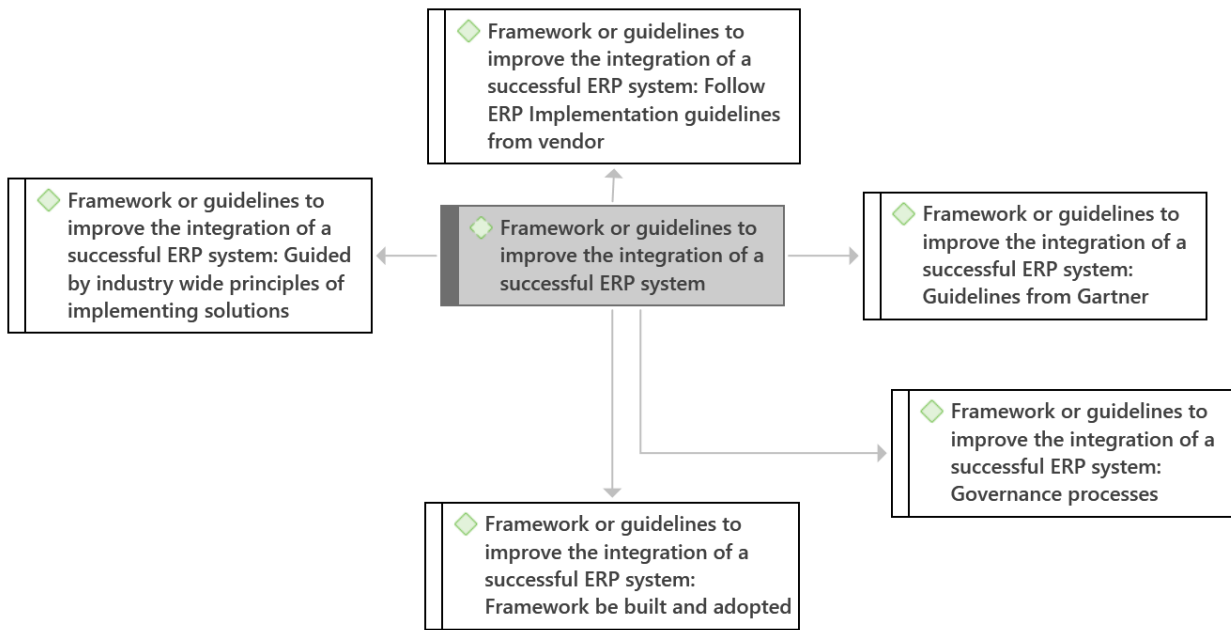
Figure 18: Guidelines to improve the integration of a successful ERP system

The factors are listed and discussed below:

- Follow ERP Implementation guidelines from the vendor.

    A participant mentioned that the vendor guidelines are also essential to follow in addition to any customisations made "*Always departs from the guidelines provided by the software supplier. Lack of adoption of standards processes and opting to customise the* systems" P15.

- Guided by industry-wide principles of implementing solutions.

    Participants seem to believe that guidelines are necessary for successful implementation and that the organisation does follow some sort of framework when implementing. This is what one participant said: *"Yes, we were guided by the basic industry-wide principles of implementing the solution"* P5.

- A framework must be built and adopted.

    Some participants indicated that a framework is imperative in the successful adoption of an ERP system *"I strongly suggest that a framework be built and adopted by organisations for ERP planning"* P19.

- Governance processes.

Participants listed governance processes as part of the guidelines that can be used for ERP system adoption but did not further substantiate the point.

- Guidelines from Gartner.

Participants suggested the organisation may be using Gartner guidelines and other guidelines from other organisations in implementing successful ERP systems. *"They usually adhere to the recommendations and guidelines of Gartner and other reputable organisations"* P13.

4.3   CONCLUSION

Four themes emerged from the survey questions, which were answered by 20 participants, and are examined in this chapter. These included the present level of implementation, factors that can obstruct/restrict a completely integrated ERP system, elements that contribute to successful ERP system deployment/adoption, and guidelines to improve ERP system integration. There was also a list of the various elements/factors that make up these themes. The findings will be presented in chapter 5 in order to make some conclusions and recommendations.

5   CONCLUSION

This chapter aims to connect the findings from the fieldwork in Chapter 4 of this dissertation with the findings from the literature study in Chapter 2 to address the research questions posed in section 1.4 of chapter 1. This chapter will also provide a summary of contributions as well as any future research recommendations.

5.1   SUMMARY OF FINDINGS

The following sub-research questions will be discussed and answered first in order to answer the main research question.

Main Research Question:
- What framework or guidelines can improve the integration of a successful ERP system in a government institution?

Sub Research Questions:
- What are some of the factors that can impede/restrict a fully integrated ERP system in government institutions?
- What is the current state of implementation in the organisation under study?
- What factors contribute to the successful implementation/adoption of ERP systems in government institutions?

5.1.1   What are some of the factors that can impede/restrict a fully integrated ERP system in government institutions?

The following variables were identified as significant in restricting a fully integrated system by the findings of this study from the fieldwork in Chapter 4: ERP system complexity, high level of customisation, inadequate flexibility, budget constraints, maintenance costs, implementation of ERP modules, strategic intent not clearly articulated, lack of support from the vendor, implementation delays and cost overruns, business complexity, no clear expectations and metrics to evaluate success or failure, lack of collaboration, size of the

project not considered during planning, not properly vetting vendors, organisational structure, poorly planned projects, selecting the right ERP solution, resistance to change, and not implementing best-recommended practices. Each variable or factor will be discussed below:

ERP system complexity

A participant in this survey stated that some ERPs are too complicated for end-users to use in their day-to-day operations. The literature suggests that the problem may not be with the system's complexity but rather with the users' lack of ability to operate the ERP system. According to the literature, ERP system challenges can be caused by a variety of internal issues. A lack of ERP system users' skills is one of them. Users may lack the knowledge needed to standardize modules so that they correspond with business procedures (Desta, 2016). The literature shows how the end-users perceive the system will play a significant role in realising success with ERP systems. Perception also dictates how utilisation will happen, thereby reaping the system's potential benefits. A study conducted by Asli Yagmur and Jaideep (2018) identified a need for management to recognise the perceptions of the end-users and the areas that yielded satisfaction or dissatisfaction with ERP systems. The study noted that when management is sensitive to the factors that yield satisfaction or dissatisfaction, then they can easily develop and employ proper strategies that are critical in improving end-user satisfaction with the system. Areas that are likely to provide resistance can be identified earlier in the process, allowing the organisation to put controls and specific actions in place to mitigate this issue of resistance and instead increase the acceptance rate of the new ERP System (Asli Yagmur and Jaideep, 2018).

High levels of customisation

In the study conducted in this survey, a participant mentioned a high level of customisation as one factor that restricts the successful adoption/implementation of ERP systems. This is supported by literature as Desta (2016) indicated that a significant issue with ERP system implementations is that they require extensive customisation as well as knowledgeable resources to perform the tasks. Another participant also supported this statement by

identifying customisation as one of the delaying factors in implementation. This was further reinforced by the literature, which claimed that ERP customisation might result in higher installation costs and longer timelines, thereby tying up resources that could otherwise be used for other purposes in the organisation, as Soliman and Karia (2017) stated. These literature findings are consistent with other literature findings as it has also been indicated that a high level of customisation in a fast-changing environment has a negative influence on cost savings, which has a negative impact on the perceived benefit of ERP SaaS technology (Lechesa et al., 2012). According to this study's findings, the issue of customisation is a major barrier to ERP system implementation and adoption.

Inadequate flexibility

Inadequate flexibility was identified in the literature as one of the factors that restrict the successful adoption/implementation of ERP systems. Participants believed that ERP systems require flexibility which in turn affects costs as extensive customisation is required (Lechesa et al., 2012). This is supported by the field study where participants mentioned that if the ERP system is not flexible to allow changes, then the organisation may need to change its processes to be able to suit the system.

Budget

Some participants mentioned size and budget as some of the factors that can impede a fully integrated ERP system in the field study undertaken. Other authors in the literature support this observation. Marikar et al. (2020) stated that the reason many ERP system implementations fail is that they usually exceed the time allocated for the project as well as the budget.

Maintenance costs

Participants in the field study indicated that regular maintenance is imperative in ERP systems, thereby impacting the costs allocated to the project. They indicated that these systems might start as less expensive; however, costs will increase over time due to maintenance required. These maintenance costs need to be factored in and the beginning

of the project for the organisation to avoid paying large amounts of money over time. The literature supports this stance as other scholars have indicated that some organisations do not have the necessary experience in managing the deployment and maintenance of ERP systems (Ng et al., 2003). Other scholars agreed that ERP systems are associated with substantial implementation and maintenance costs (Lechesa et al., 2012).

Implementation of ERP modules that are not necessary

In the field study, participants mentioned the implementation of ERP modules that are not necessary as one of the factors that restrict the successful implementation of ERP systems. This was not supported by the literature observed.

Strategic intent not clearly articulated

According to some of the participants in the field study, not enunciating the strategic intent of the implementation with clear expectations and metrics to evaluate success or failure contribute to unsuccessful implementations of ERP systems. In the literature, scholars support the view that a clear strategic direction or vision is imperative throughout the ERP project lifecycle in the successful implementation of ERP systems (Mahmood et al., 2019). This was further supported by other scholars who mentioned clear strategic objectives among factors that are crucial in the successful implementation of ERP systems (Saade and Nijher, 2016).

Unrealistic timelines for implementation

One of the issues inherent with ERP installations, according to participants in the field survey, is timeliness. Project managers strive for speedy implementation before all the activities are in place. The evidence in the literature was inconclusive.

Lack of support from the vendor

Vendor support was identified as one of the essential variables that appeared to be constant as enabling factors for the effective installation of ERP systems across industries

and geographic regions by researchers' studies undertaken. As a result, it can be deduced that a lack of vendor support will compromise a successful implementation (Saade and Nijher, 2016).

Implementation delays and cost overruns

A participant in the field study stated that poorly planned projects result in delays and cost overruns. This is supported by literature as Desta (2016) suggested that when management does not consider the extensive customisation and resource skills required in ERP implementations, this can delay the project and cause cost overruns.

Business complexity

Business complexity was stated as one of the factors that may impact the adoption of ERP systems in the field study. However, the researcher found no evidence in the literature to support this.

No clear expectations and metrics to evaluate success or failure

Participants in the field survey stated that there are no defined goals or matrices for evaluating project success or failure. However, the researcher could not locate any studies that supported this position in the literature.

Lack of collaboration

Lack of collaboration was among the main factors that participants in the survey raised. They stated that ERP system implementation and adoption fail because of a lack of collaboration among different team members. The literature supports this as it has been observed by Malaurent and Avison (2015) that a successful implementation also requires collaboration between researchers and practitioners to make improvements to practice rather than merely watching and reporting to management. Mahmood et al. (2019) also stressed the value of collaboration between vendors and consumers in successfully installing such as system in organisations.

The size of the project was not considered during the planning

Size and budget were noted by some participants as constraints that could obstruct a fully integrated ERP system in the field survey. Slack and size, on the other hand, are two of the most regularly recognized elements in the organisation that affect innovation, according to the literature. Size has also been thoroughly studied; however, there is no conclusive link between this factor and innovation established, and scholars argue that more specific organisational features, rather than the generic measure "size," should be utilised instead (Baker, 2012b).

Not properly vetting vendors

Participants in the field survey stated that an organisation must thoroughly vet its vendors to avoid additional and unnecessary costs as well as maintenance costs down the road. Vendors should be thoroughly vetted to ensure that the best ERP system provider is selected. Choosing consultants and service providers is almost as important as deciding which ERP systems to implement in a business. Comparing and selecting partners for software, hardware, databases, networks, and other services is what vendor selection comprises. Vendors and consultants are a significant component in ERP system success, according to numerous academics, and are ranked #7 in one study conducted. According to the study, ERP vendor selection criteria are often based on product attributes rather than stakeholder satisfaction. When shortlisting ERP vendors, variables such as the financial viability of the vendor, diligence, and other variables must be considered. Panorama Consulting, a provider of ERP systems and business software, claims that 50% of participants were dissatisfied with their ERP vendor. Therefore, it is vital to offer sufficient data to support the choice of a particular provider. As a result, selecting ERP and vetting the vendors is critical to successfully implementing such a system in organisations (Mahmood et al., 2019).

Organisational structure

In order to determine its relevance to the innovation adoption process, the organisational structure has been studied more broadly. Organic, decentralised organisational systems

are associated with adoption. These organisations place quality on collaboration, provide some flexibility in employee duties, and encourage cross-communication in addition to the traditional reporting lines. While distributed and organic structures could be best appropriate to the innovation phase of the process, power-driven structures may be better appropriate to the implementation phase, with more importance placed on formal reporting relations, consolidated decision-making processes, and visibly well-defined roles for workforces and teams. Communication methods can either promote or stifle innovation within an organisation's framework (Baker, 2012b). In the field survey, 25% of the participants believed that the organisational structure and culture promote new ways of working, such as ERP systems, for a more efficient style of working, while 40% of the participants did not agree or disagree.

Poorly planned projects

Poorly planned projects were mentioned in the field survey as a risk that can inhibit ERP deployment and cause delays and cost overruns. Only half of the participants agreed that ERP implementation projects are well-managed and simple to use. In the literature, research was carried out in Jordan to explore project management factors that influence ERP system deployment. A successful ERP implementation relies heavily on project management, and weak project management skills are frequently blamed for failed implementations. As a result, for any ERP project, having a skilled project manager is crucial, as is excellent communication, which helps to develop trust among employees and deliver the information necessary for a successful ERP deployment. Furthermore, a well-prepared and qualified team will facilitate and assist their manager in completing the project successfully; this can be accomplished by clearly defining roles and responsibilities for them to understand their assignments and providing them with the required training to improve their capabilities and knowledge level (Janssens et al., 2020).

Selecting the correct ERP solution

In the literature, the researchers discussed the consequences of choosing the wrong ERP vendor and ERP solution and found elements that contributed to ERP implementation failure in these companies. Business process re-engineering, a lack of collaboration with

local vendors to understand the organisation's needs, a lack of adequate human resources, and language hurdles when dealing with international vendors were among these factors. One of the critical success factors of ERP implementation and adoption is the thorough selection of an ERP product that fits the organisation's social and cultural aspects in that specific region and is understood by all employees (Saade and Nijher, 2016). Participants in the field study concurred with these findings as they mentioned that selecting the right ERP solution is crucial in a successful implementation. Potential ERP users should be encouraged and included in the selection of ERP packages for the company, according to previous research findings. Because there are various solutions given by different vendors in the market, case studies conducted in 2001 and 2003 focused on the selection of an appropriate ERP package as one of the important success elements for a successful installation of an ERP system (Somers and Nelson, 2001; Soh et al., 2003). As a result, it's critical to pick the best solution for the problem that the company wants to solve in their business and operations (Saade and Nijher, 2016).

Not implementing best-recommended practices

A participant in the field survey highlighted not executing best-recommended practices as a factor that contributes to the failure of ERP system adoption and implementation. However, no evidence for this could be identified in the literature reviewed.

5.1.2 What is the current state of implementation in the organisation under study?

The majority of developing countries are currently embracing e-Government platforms, such as ERP systems and other information technology solutions. While emerging countries can transcend technological generations, developing countries will find it hard to. Technical systems are typically developed alongside institutional development in developed countries, allowing them to advance at all levels to gain a competitive advantage. Underdeveloped countries expect to progress at the same pace as developing countries (Content, 2016).

Participants in the field study described the current state of implementation in the research organisation. The following are some of the more positive explanations for the current adoption/implementation state:

- ERP system is adopted.
- Gradual and stable growth.
- High adoption rate.
- The platform is well supported.
- The organisation and system maturity score is good.
- All modules are being used.

Some participants, on the other hand, offered different justifications, implying that the current status of adoption in the organisation is not adequate. A few of the explanations are listed below:

- ERP system needs enhancement.
- Modules that are part of the ERP solution are implemented independently of the system.
- Implementation was delayed due to missing requirements.
- Lack of adoption from users due to a preference of other organisations.

5.1.3 What factors contribute to the successful implementation/adoption of ERP systems in government institutions?

According to the conclusions of this study from the fieldwork in Chapter 4, the following variables are important in enabling the successful implementation of a fully integrated system:

Effective change management policies

According to the survey results, only 35% of the participants agreed that there are effective change management policies in the organisation. 50% of the participants neither agreed nor disagreed. Refer to Appendix F. Effective change management practices and policies

are a critical component of ERP implementation projects that require modifications to business processes, according to the literature examined. Change management was placed second from the top as one of the essential variables with a high frequency of citation in past studies. From the start of ERP implementations, change management measures must be prioritised (Mahmood et al., 2019). The results of this study are consistent with other studies that have demonstrated that corporate transformation requires a well-defined organisational vision of the future and a practical change management approach to balance forces in favour of transformation against those opposed to change (Asli Yagmur and Jaideep, 2018).

Contracting necessary

In the field survey, participants stated that technical expertise was a challenge in the organisation and that contracting was necessary to assist them with ERP deployments. In the literature reviewed, there is no indication that contracting is vital in the effective adoption of ERP systems.

Cost and of maintenance

Cost and ease of maintenance were mentioned by some of the participants as factors that can encourage the implementation and adoption of ERP systems. According to research published in the literature, a well-designed and well connected ERP system improves information sharing among company units, resulting in cost savings and increased efficiency, as well as competitive advantages (Deshmukh and Kumar, 2016). These findings are in line with previous studies findings, which claim that an ERP system can provide a variety of benefits to an organisation. Among these advantages are cost reductions (Jafari and Zolfagharian, 2019). However, participants in other research believe that ERP systems require flexibility, which has an impact on cost. As a result, the subject of SaaS cost reduction cannot be evaluated in isolation (Lechesa et al., 2012).

End-user specialised knowledge

ERP system adoption and deployment, according to participants, necessitates specialised knowledge for the system users. The results of the field survey indicated that there are conflicting views about whether the organisation has the specialized knowledge and digital skill expertise it needs to operate these efficiently and successfully. Only 35% of respondents agreed or strongly agreed that the organisation has the essential expertise to carry out its technological responsibilities, according to the survey results in appendix D. The remaining participants were either opposed to the idea or were undecided. Training is the most effective way to upskill workers so that they can use the systems. Furthermore, a well-prepared and qualified team will undoubtedly assist their manager in completing the project successfully; this can be accomplished by clearly defining roles and responsibilities so that they understand what they must do, as well as providing them with the necessary training to improve their capabilities and knowledge level (Janssens et al., 2020).

ERP implementation meets organisational requirements

Participants in the survey mentioned that customisation and user requirements were some of the delaying factors in the successful implementation of ERP systems. It can then be concluded that the correct requirements that meet the organisational needs will result in the successful implementation and adoption of an ERP system. In the literature, researchers have suggested that the customisable limit may need to be adjusted as much as possible toward the client's unique requirements in order to suit the individual requirements of clients (Lechesa et al., 2012). Other researchers have suggested that there is no single application that can meet all an organisation's needs. Furthermore, when the organisation's needs change over time, it is feasible that other manufacturers' modules will be purchased (Mahmood et al., 2019).

Fit the culture of the organisation

Participants in the field survey cited organisational culture as a critical factor in ERP system adoption. According to the survey results in Appendix E, 50% of respondents agreed that people in the organisations have the same working culture. Only 10% of the participants strongly agreed, while the remainder disagreed or did not agree or disagree.

Furthermore, 50% of the participants felt that the way people conduct things in the organisation is influenced by culture. Many people agree with this, with 35% strongly agreeing and the rest saying they don't know. Organisational culture reflects employees' views, attitudes, activities, and ideals. Past studies have led to the conclusion that organisational culture has a significant impact on ERP adoption success. These studies also identified a correlation between ERP success and corporate culture. In other prior studies, organisational culture was found to contribute to a positive interaction between ERP staff and vendors, which in turn aided ERP deployment success. ERP adoption requires a learning and development culture that comprises shared ideals, new ideas, transferable skills, and knowledge (Mahmood et al., 2019). The findings of this current study suggest that organisational culture is critical during the implementation of ERP systems and that senior management must ensure that a culture that is encouraging to ERP implementation is developed.

Top management support

In the field survey, more than one participant expressed top management support as one of the critical success factors for ERP system deployment. According to the survey results in Appendix D, senior management support for the implementation of ERP systems to manage the organisation's operations is 80% or higher. The necessity of top management support and team commitment to actively participate in the project is stressed by a researcher in the literature studies. If senior management is unavailable to enforce their policies on their staff and if the project's employees do not commit, the entire project may be terminated, postponed, or fail (Janssens et al., 2020). This is supported by many other researchers, as Chatzoglou et al. (2016) also indicated that a solid top management commitment and presence is a critical factor in the successful implementation of ERP systems as these include substantial changes in the organisation. Even earlier studies conducted by Shanks et al. (2000) include top management as one of their 11 critical success factors that contribute to a successful ERP system implementation.

ERP training before and post-implementation

Participants mention the ease of use and training as some of the critical factors that can contribute to a successful implementation and adoption of an ERP system. According to the survey results in Appendix E, 65% of the participants agreed that there is a solid commitment to the training and development of people when new ERP systems are introduced in the organisation. In the literature, training is one of the factors that have been identified by Shanks et al. (2000) as critical in the successful adoption of an ERP system. A conceptual framework created by Nofal and Yusof (2015) also includes training as a significant factor in a successful implementation. Other work done by Janssens et al. (2020) and Nemathaga (2020) also emphasizes that training is necessary to improve the capabilities and knowledge levels of system users and technical resources. Mahmood et al. (2019) stated that one of the main difficulties facing organisations is training and development. A significant difficulty is employee skill development. ERP systems are complex, requiring specialized knowledge and training. According to a 1996 study on ERP implementation by Koch (1996), 30-40% of employees were unable to run a new ERP system due to a lack of training. Another study by Hong and Kim (2002), highlighted insufficient user training as an ERP risk factor in 2002. As a result, ERP failures may occur as a result of insufficient training. ERP systems demand continuous training, and organisations should provide employees with the opportunity to increase their ability to adapt to change. According to some experts, ERP training programs should be designed to persuade ERP stakeholders of the benefits of ERP systems from the onset of the ERP project (Mahmood et al., 2019).

Visibility of activities at all stages of the workflow

Participants in the field survey stated a need to combine organisational processes and various systems into a single platform where transactions may be executed end to end with visibility at all stages of the process. According to the survey results in Appendix F, 60% of the participants agreed that mechanisms are in place to assist the organisation in managing new ERP systems from development to deployment. The organisation also engages in effective re-engineering of business processes, according to 50% of respondents. However, more than half of the participants were doubtful whether the

organisation's change management practices were effective. Integration was cited as an important element when dealing with ERP system implementations. ERP systems may comprise multiple modules to meet organisational needs for the seamless running of business processes at the department and enterprise levels. If the ERP system relates to other business systems, the ERP system's potential benefits may be realised. As a result, one of the most crucial elements to consider while establishing ERP is system integration. As a result, it could assist with organisation operations optimisation and efficiency (Mahmood et al., 2019).

Willingness to change (People's adoption of the system)

More than one participant in the survey cited a willingness to change and adopt new ways of working as an essential factor in implementing and successfully adopting ERP systems. Researchers have indicated that for the organisation to take full advantage of implementing ERP systems, the management efforts should be on cultivating user adaptation to the system. This can be done by doing some customisation of business processes to support existing functions as well as adjusting business processes to align with the best practices of ERP systems in order to make the system more user-friendly and familiar to the users. Once the system users are comfortable with the system, it will then make the people's adoption of the system easier. The perception of the system by end-users is critical to the ERP system's performance. It also specifies how the system will be used, allowing the technology's potential benefits to be realized. According to a 2018 study by Asli Yagmur and Jaideep (2018), management needs to understand end-user perspectives and the areas that result in satisfaction or discontent with ERP systems. They found that when management is aware of the aspects that lead to happiness or discontent, they may more easily plan and implement effective methods for enhancing end-user satisfaction with the system. Areas that are likely to cause resistance can be recognized earlier in the process, allowing the organisation to put controls and particular activities in place to prevent opposition and instead boost the new ERP System's acceptance rate (Asli Yagmur and Jaideep, 2018).

Inept following of SDLC

In the field survey, participants stated that the inept following of the SDLC can encourage the implementation and adoption of ERP systems. In the literature reviewed, there is no indication that the inept following of the SDLC is important in the effective adoption of ERP systems.

Internal technical resources availability

A participant in the field study mentioned the availability of internal technical skilled resources as critical in the successful implementation of ERP systems. ERP demands individuals with specific skills; therefore, a shortage of skilled technical personnel may appear to be an issue. People with a low degree of expertise focus on the essential tasks of ERP and neglect to use the system's complex capabilities. Most importantly, there will be a substantial knowledge gap if a key ERP person departs the organisation. Businesses must focus on personnel development and training in order to properly execute and sustain such initiatives (Mahmood et al., 2019).

Passes quality gates

According to a review of the literature, a study conducted in Pakistan on socio-technical factors impacting the successful implementation of ERP systems found that 13 of the Crucial Success Factors (CSFs) identified were critical to the success of ERP projects. Risk management, results measurement, quality management, and performance evaluation were among the additional CSFs identified as essential success determinants (Saade and Nijher, 2016). According to the findings of this present study, quality management is critical during the implementation of ERP systems. High-quality systems can help assure effective adoption by lowering expenses incurred when a system fails to function as intended and must be repaired and encouraging users to utilise the system frequently. This links with top management identified since management will have to ensure that quality gates are adhered to and observed.

Proper planning of the project

A clear vision and planning are among the factors that were identified by Nofal and Yusof (2015) in their conceptual framework as critical to a successful ERP implementation. (Mahmood et al., 2019) argues that top management is in charge of carefully preparing the changeover process. During the planning and pre-implementation phases of an ERP system's life cycle, businesses must establish their business requirements and ERP system operations. This should be done to ensure that the two processes indicated are as compatible as possible (Desta, 2016). The conclusion of a study done by Saade and Nijher (2016) cited that top management, a clear vision, vigorous planning, the availability of the right resources, business process re-engineering, change management, a pro-active culture, accuracy of data, training, monitoring, and evaluation are amongst the crucial critical success factors in the ERP implementation. Considering this analysis, it is important to know that careful and thorough planning is essential in the implementation of these systems.

5.1.4 What framework or guidelines can improve the integration of a successful ERP system in a government institution?

The following elements emerged as principles that can enable a fully integrated ERP system in a government organisation, according to the findings of this study from the fieldwork in Chapter 4:

Follow ERP Implementation guidelines from the vendor

A participant mentioned that the vendor guidelines are also essential to follow in addition to any customisations, but no further information to support this was observed in the literature studied.

Guided by industry-wide principles of implementing solutions

Participants seem to believe that guidelines are necessary for successful implementation and that the organisation follows industry-wide principles or a framework when implementing ERP solutions.

Framework be built and adopted

Some participants indicated that a framework is built that can be used as a guideline in the successful adoption of an ERP system, but no further information to support this was observed in the literature studied.

Governance processes

Governance processes were one of the factors mentioned as a guideline that can assist in the successful implementation of ERP systems. This was not further substantiated in the responses from the survey nor in the literature observed.

Guidelines from Gartner

Participants suggested the organisation may be using Gartner guidelines and other guidelines from other organisations in implementing successful ERP systems. As derived from Gartner (2022)'s report analysis, major providers in cloud ERP include, amongst others, Oracle (Fusion Cloud ERP), Workday, Infor, SAP (S/4HANA) and Oracle (NetSuite). See Gartner (2022)'s magic quadrants for cloud ERP - product-centric enterprises in Figure 19.
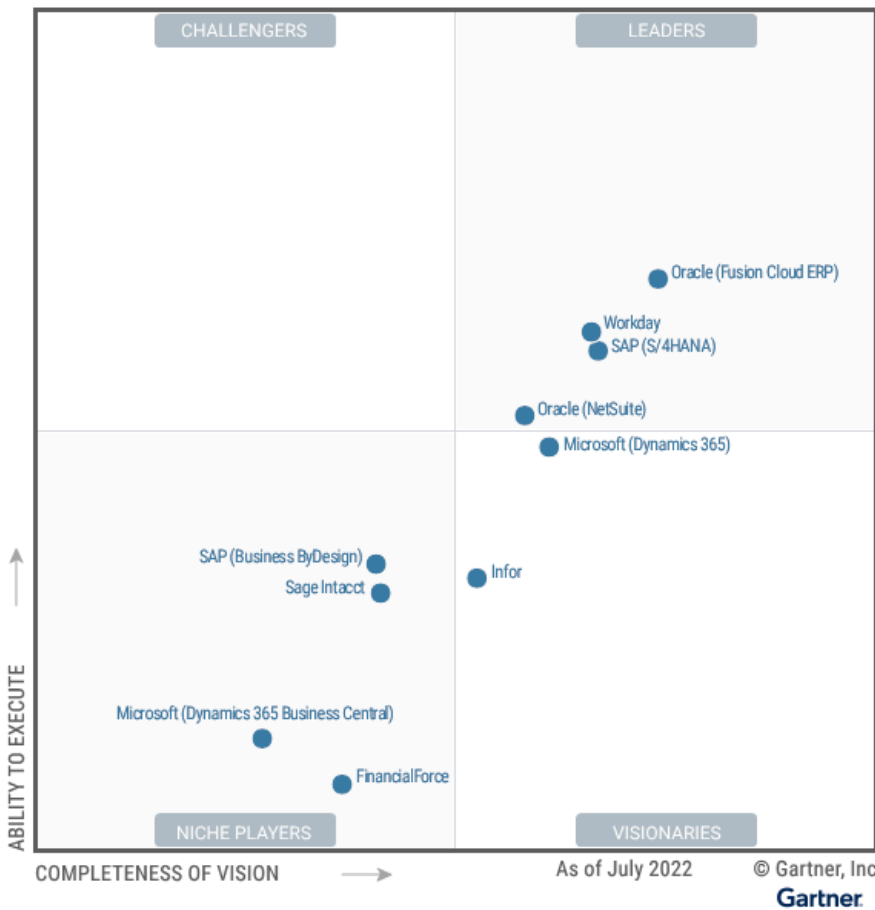
Figure 19: Gartner's magic quadrant for cloud ERP - product-centric enterprises (Gartner, 2022).

Gartner (2022)'s findings were derived from their research across organisations in various industries such as professional service organizations, healthcare, telecom, real estate, media, software and financial services. Additional industries such as the public sector and higher education were also considered. Gartner (2022)'s criteria for the ERP applications that were included were limited to only those applications that are integrated and contain at least three products in the suite. The findings were based on the vendor's ability to execute as well as the completeness of the vendor's vision. Gartner (2022) evaluates a vendor's ability to execute by examining the products, technology, services, and business practices that help them succeed in the market to increase their revenue. They also evaluate client retention and satisfaction rates, as well as the overall reputation. Furthermore, Gartner (2022) evaluates vendors' completeness of vision by assessing their capability to communicate their perspective on the market's existing and potential future developments, identify customer requirements and cloud technology trends, and for them to respond to competitive forces.

5.2 CONCLUDING REMARKS

5.2.1 Theoretical framework with guidelines to assist in the successful adoption of ERP systems in government institutions and other institutions

In this study, a framework is required to provide practical guidelines that can facilitate a successful implementation or adoption of an ERP system. In this section, a framework for understanding how the factors discussed can be investigated as possible guidelines that can assist in the adoption of a successful ERP implementation has been developed. These factors are differentiated into the ones critical for success, factors that can restrict a successful adoption, and the current state of adoption/implementation of ERP systems. The TOE framework is a hypothesis that claims that three aspects of an organisation's environment have an impact on innovation adoption and implementation. The technological, organisational, and environmental settings are the three factors that make up this set. All three elements are positioned to have an impact on technological advancement (Baker, 2012a). Because ERP systems have been widely used for complex innovation adoptions, the researcher has been able to explain the elements that influence ERP system adoption in governmental institutions using the TOE theoretical framework as well as the framework developed in this study. Figure 20 shows the framework developed in this study.
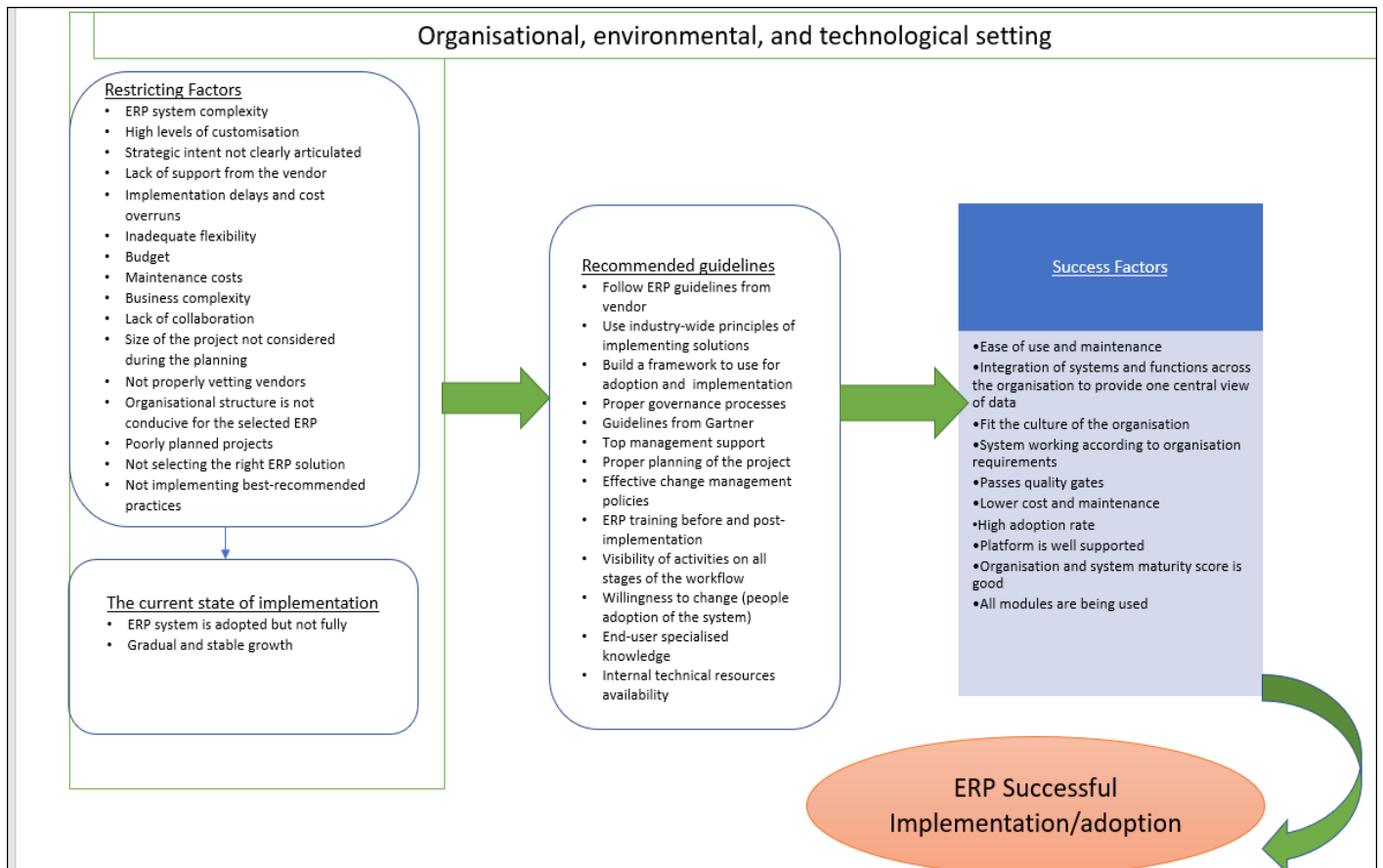
Figure 20: A framework of possible guidelines that can assist in the adoption of a sustainable ERP system

A framework was created to explain the variables and how they connect. To construct the framework, the researcher mainly used factors that were either mentioned in the literature or the field study as critical in the successful implementation of ERP systems. Furthermore, the guidelines that were highlighted by the participants as critical in the implementation of ERP systems in Figure 18 were incorporated into the construction of this Framework (Figure 20). Factors that affect the adoption of ERP systems were found in a mixture of organisational, environmental, and technological settings. A study conducted by (Peng, Sun and Guo, 2018) integrated personal, environmental, and technological antecedents into their research framework. The study revealed that personal, environmental, and technological factors directly interact with each other to contribute to technology use and acceptance (Peng et al., 2018).

The variables that impede the successful adoption of ERP systems as well as those that contribute to the successful adoption span across organisational, technological and environmental factors. In the framework in Figure 20, factors such as top management support, proper planning of the project, and ERP training before and post-implementation are among the factors that are critical for organisations to obtain benefits from investing in a sustainable ERP system. In the literature review as well as the field study, the organisational factors that impede the successful adoption of ERP systems were stated as strategic intent not clearly articulated in the organisation, lack of support from the vendor as well as not properly vetting the vendors at the beginning, poorly planned projects, not implementing best-recommended practices, not selecting the right ERP solution, inadequate budget for information systems implementations as well as an organisational structure that does not fully support information systems. If these factors are addressed adequately, then they become critical success factors. For instance, poorly planned projects as a restricting factor can be addressed by the proper planning of projects, which then leads to a successful ERP implementation/adoption. Likewise, ease of use and low maintenance becomes a success factor when addressing high maintenance costs (restricting factors). This then shows a dependency relationship between the restricting factors and some of the success factors.

Additional impeding technological factors that emerged from this study included ERP system complexity (Nemathaga, 2020), the system requiring high levels of customisation, implementation delays and cost overruns, inadequate system flexibility and high maintenance costs. Environmental factors that impeded a successful adoption included business complexity, ERP system complexity and the organisational structure not being fully adequate to support information systems implementations. These factors that restrict ERP systems adoption directly impact or determine the success factor when addressed correctly. The benefits of investing in a sustainable ERP system can be factors such as the integration of all systems/modules in the organisation that are easy to use and maintain as well as a system that is fit for purpose and meets the organisational requirements.

In this study, it also emerged that following the guidelines from the vendor, using industry-wide principles, proper governance processes, or even guidelines from Gartner (2022)

heavily influences the state of adoption in organisations and, ultimately, how successfully they become with ERP implementations. Building a framework through research can also assist organisations in their quest for successful ERP implementations and adoption. This can then serve as a proven guideline derived from previous research. The organisational framework must be well-structured to encourage the adoption of new technology (Baker, 2012b).

5.3   SUMMARY OF CONTRIBUTIONS

The findings of this study reveal that the elements that contribute to successful ERP system implementation or that prevent ERP system adoption are unaffected by the industry or the area where the organisation is located. Instead, they span several organisations and industries. There are several essential success criteria described in the literature by other scholars, as well as factors found in this study, that can provide suggestions for effective adoption or implementation. Even with these elements in place, organisations are still having difficulty implementing and maintaining a fully integrated system adoption. This study has contributed to the body of knowledge in the adoption/implementation of ERP systems in organisations found in South Africa and other developing countries. The survey also revealed the current state of adoption in the organisations, which may be similar to that of many other organisations across industries and locations.

5.4   FUTURE RESEARCH

More research could lead to a better understanding of a simple model that can help with ERP implementations in a variety of businesses and locations. A case study can also be conducted in one or more organisations to observe their ERP implementations and subsequent operations. This could be useful for company executives searching for a competitive advantage, as well as other researchers interested in learning more about ERP system implementation and adoption.

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Appendix A: Survey Questionnaire

The Purpose of my Research:

The purpose of this study is to investigate the guidelines that can be used for South African government institutions in the adoption of a sustainable ERP system to improve their information systems strategy and thus reduce costs brought about by the inadequate use of resources.

Administration:

I am a master's student in the Economic Management Sciences Department, University of Pretoria. This research forms part of my full MCom Dissertation Informatics qualification.

You were chosen as a respondent because you are involved with the planning or implementation, and execution of projects and have the necessary knowledge and experience.

Confidentiality and Consent:

Your participation is voluntary, and you are allowed to revoke participation at any time without penalty or negative consequences. Throughout the survey, your confidentiality will be protected, and your participation will remain anonymous. Data will be analysed as a unit, and the responses will be grouped by the organisation or the department in the final report. This will ensure that the respondents will remain anonymous.

If you agree to take part, please complete the survey questionnaire that follows this cover letter.

By completing the survey, you indicate and give consent that you voluntarily participate in this research.

The research project has been subjected to ethical review in accordance with the processes specified by the University of Pretoria Research Ethics Committee. The project has been awarded a favourable ethical opinion for conduct. If you have any concerns, please contact me with the detail provided below.

Researcher name: Tahani Shimange

Email: Tahani.shimange@gmail.com/Tahani.Shimange@resbank.co.za

Phone: 0794930831

If you do agree to take part in completing these 32 questions survey, I would be very grateful. Please complete and return the survey by email by 30 October 2021. **The approximate time for completion is 40 minutes.**

Thank you for participating in this survey.

General Information

Please select/complete where applicable:

Sector	Public	
Organisation	South African Reserve Bank	
Your Position	Management	
	Non-Management	
	Support	
	Operations (Core Business)	
Position Level	Skilled workers, junior management, and supervisors	
	Professionally qualified: experienced specialists and middle management	
	Top management, senior management	

Please select/tick where applicable:

	Organisational	**Strongly Disagree 1**	**Disagree 2**	**Neither Agree nor Disagree 3**	**Agree 4**	**Strongly Agree 5**
1	There is proper planning for ERP implementation projects.					
2	Everyone in the organisation shares a clear vision for ERP system implementation.					
3	The organisation clearly communicates its ERP system implementation strategy.					
4	The organisation clearly communicates how its ERP system implementation strategy will impact its operations and assist the organisation in achieving its objectives.					
5	The organisation has a clear understanding of how ERP systems can enhance its competitive environment.					
5	There is Senior Management Support for the successful implementation of ERP systems to manage the organisation's transformation and change.					
6	The organisation already has the required technological skills and expertise to operate effectively.					
7	There is an efficient innovation process to focus on ideas and take them from concept to implementation.					

		Strongly Disagree 1	Disagree 2	Neither Agree nor Disagree 3	Agree 4	Strongly Agree 5
8	The organisation is good at generating new ideas to improve performance.					
9	"The organisation takes a proactive approach to product innovation in the digital environment."					

	Environmental setting	Strongly Disagree 1	Disagree 2	Neither Agree nor Disagree 3	Agree 4	Strongly Agree 5
1	There is consistent communication around the changes being made, especially among those that use the ERP system on a daily basis.					
2	We share the same culture of working in the organisation.					
3	"There is a solid dedication to training and development of people in the organisation when new ERP systems are introduced."					
4	The team is not penalised for making mistakes.					
6	Communication is effective across the organisation.					
7	We work well in teams.					
8	The organisation supports teamwork and also allows people to express their individualism.					
9	People are engaged in suggesting ideas for improvements to products and processes.					
10	Culture influences the way we do things in the organisation.					

	Technological	Strongly Disagree 1	Disagree 2	Neither Agree nor Disagree 3	Agree 4	Strongly Agree 5
1	Our organisational structure supports new ways of working, for example, new ERP systems for a more effective way of working.					
2	The organisation has quality, good integrity data that enable effective decision-making.					

3	Overall, the organisation's ERP systems are well integrated and streamlined where possible.					
4	There are processes in place in the organisation to help us manage new ERP systems from development to launch."					
5	The organisation's ERP systems are effective and easy to use.					
6	The organisation engages in effective re-engineering of business processes.					
7	ERP implementation projects are managed effectively.					
8	The organisation has effective change management strategies.					

Other Questions – please provide n brief explanation of each question

1. Can you briefly provide a short depiction of your position in relation to ERP implementation in the organisation?
2. What are the factors that influenced the adoption of ERP systems in large organisations in South Africa?
3. What are the kind of challenges you have come across when implementing ERP systems in the organisation?
4. Does the organisation follow any guidelines when adopting and implementing these ERP systems in the organisation?
5. What is the current state of adoption/implementation of ERP systems in the organisation?

Appendix B: Survey Data (Transformed)

Organisational Setting

Participant No	Question_1	Question_2	Question_3	Question_4	Question_5	Question_6	Question_7	Question_8	Question_9	Question_10
1	2	3	3	3	4	4	2	3	3	4
2	4	3	4	4	5	5	2	4	5	5
3	3	3	3	3	4	5	3	4	3	4
4	3	3	2	2	3	3	2	2	2	1
5	4	3	4	4	4	5	3	4	4	3
6	3	3	3	3	3	3	3	3	4	3
7	4	3	4	4	4	4	3	3	3	3
8	4	4	5	5	4	4	4	4	4	4
9	4	4	2	3	4	4	4	3	2	2
10	4	4	5	5	3	5	3	3	4	2
11	4	3	4	3	3	4	3	4	2	2
12	1	5	5	4	5	5	5	3	5	5
13	4	3	4	4	4	5	5	4	4	4
14	4	3	4	4	4	4	5	4	4	4
15	2	2	4	2	2	3	4	2	4	2
16	4	3	3	4	4	4	3	3	3	4
17	4	4	3	4	4	5	4	3	3	3
18	2	2	2	2	3	4	2	2	2	2
19	3	2	2	2	2	2	2	2	3	3
20	4	4	4	4	4	4	3	4	3	4

Technological Setting

| Participant No	Question_1	Question_2	Question_3	Question_4	Question_5	Question_6	Question_7	Question_8	Question_9
1	4	3	4	3	4	3	4	2	5
2	4	4	3	4	5	3	4	5	5
3	3	3	3	3	2	3	3	4	3
4	2	3	2	3	3	3	2	2	3
5	4	5	5	3	5	4	4	4	5
6	3	4	3	3	4	4	3	4	4
7	4	4	4	3	3	4	4	4	3
8	4	4	5	4	4	4	4	4	4
9	2	2	2	3	2	4	3	4	5
10	3	5	5	4	3	4	5	3	4
11	4	3	4	3	4	4	4	3	5
12	5	4	4	3	5	5	5	4	5
13	4	4	5	4	4	4	5	4	4
14	5	4	4	3	4	4	4	4	4
15	3	4	4	2	3	4	4	4	4
16	4	4	4	4	3	4	4	4	4
17	3	4	4	3	4	4	5	4	5
18	2	3	2	3	2	4	3	3	4
19	2	2	2	3	3	2	3	2	4
20	3	2	4	4	4	4	4	4	4

Environmental Setting

Participant No	Question_1	Question_2	Question_3	Question_4	Question_5	Question_6	Question_7	Question_8
1	3	3	4	3	2	3	3	3
2	5	5	5	4	4	4	3	3
3	3	2	3	3	3	3	3	3
4	2	3	2	3	2	2	3	3
5	5	4	4	4	4	4	4	5
6	3	3	4	3	3	3	3	3
7	3	2	4	4	4	4	4	4
8	4	5	4	4	4	4	4	4
9	2	3	4	4	4	3	3	3
10	4	5	3	5	4	4	4	3
11	3	4	3	3	4	2	4	3
12	5	5	5	5	4	5	5	4
13	5	4	4	4	4	4	4	4
14	4	5	5	4	5	4	5	5
15	2	4	2	4	2	1	4	4
16	3	3	4	4	4	3	4	4
17	4	4	4	4	3	4	4	4
18	3	2	2	2	2	2	3	3
19	3	3	2	3	3	3	3	3
20	4	3	2	3	3	4	4	2

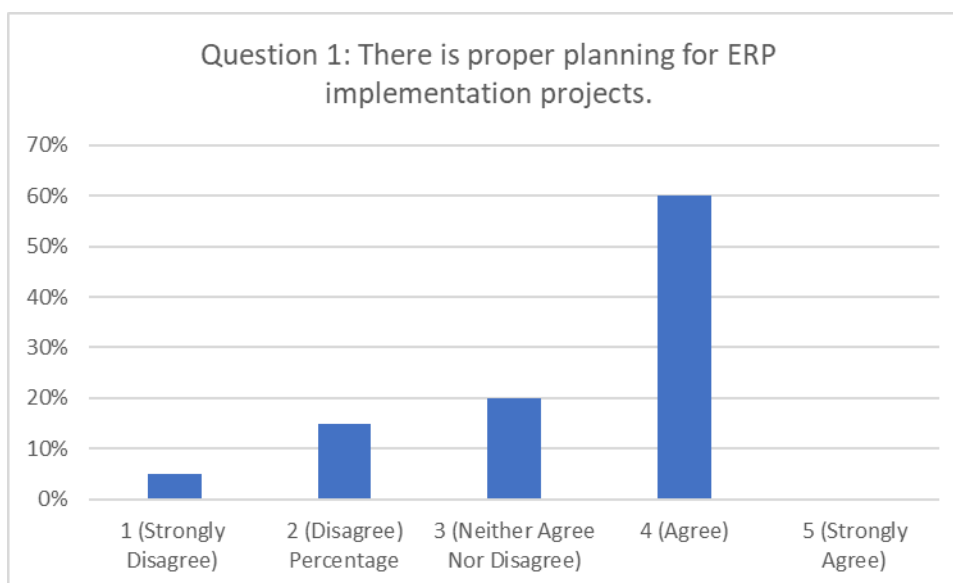# Appendix C: Demographic Analysis in terms of Position

Participants by Position Level

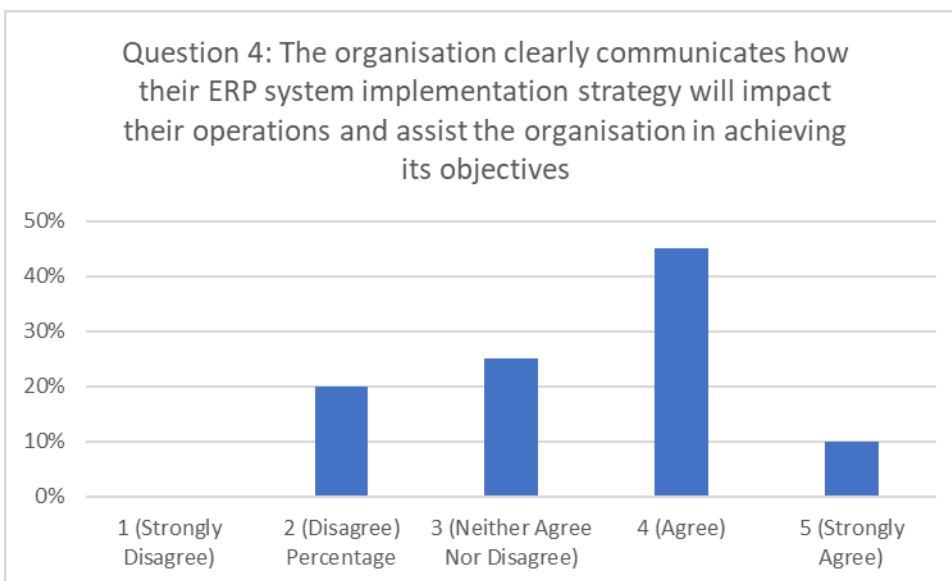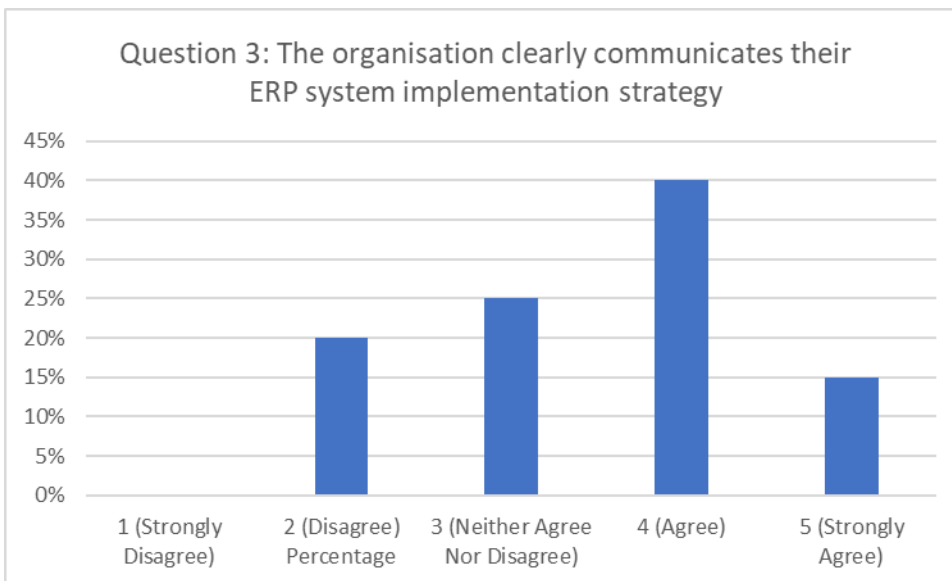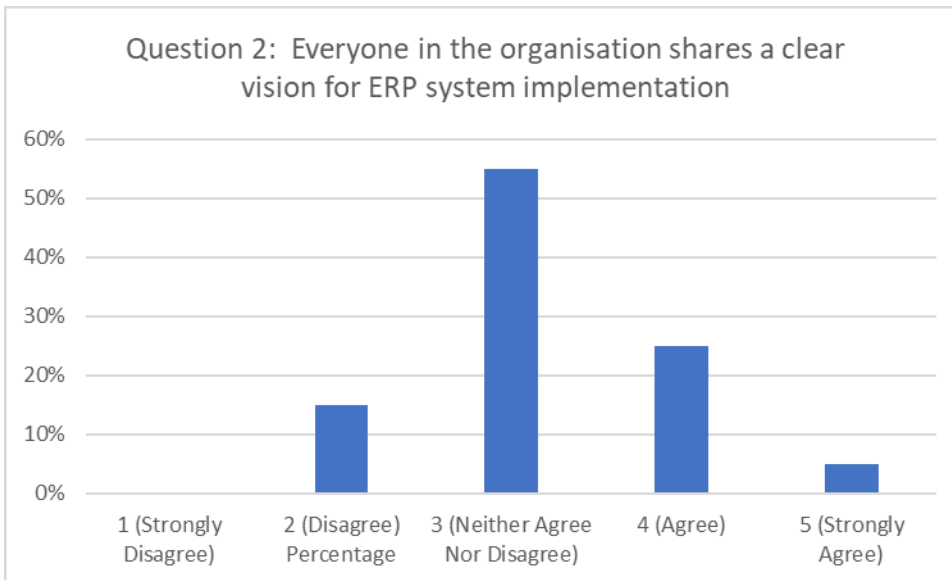| Participants	Total	1 - Management	2 - non-Management	3 - Support	4 - Operations (Core Business)	TOTAL
Your Position	20	40%	30%	15%	15%	100%
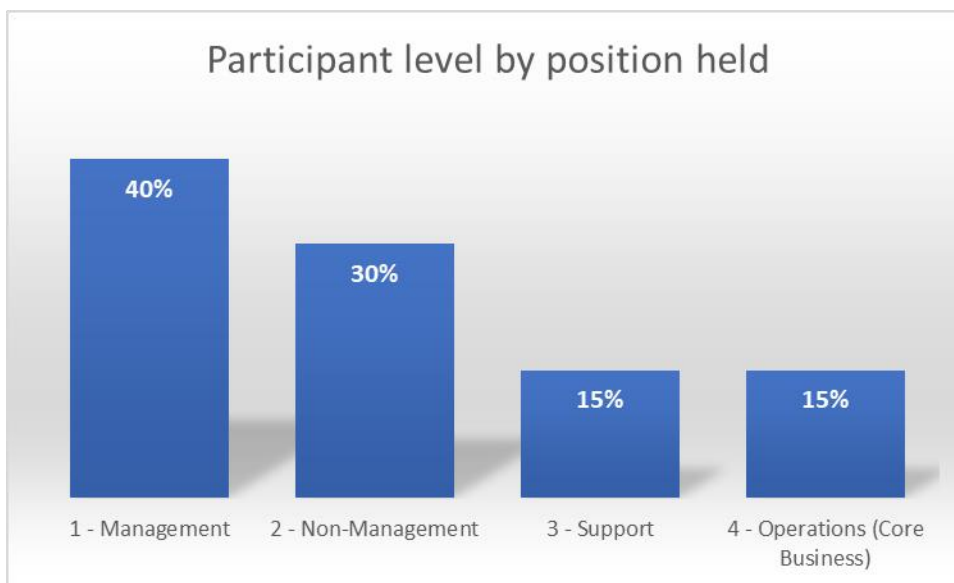
Participants by Position Level

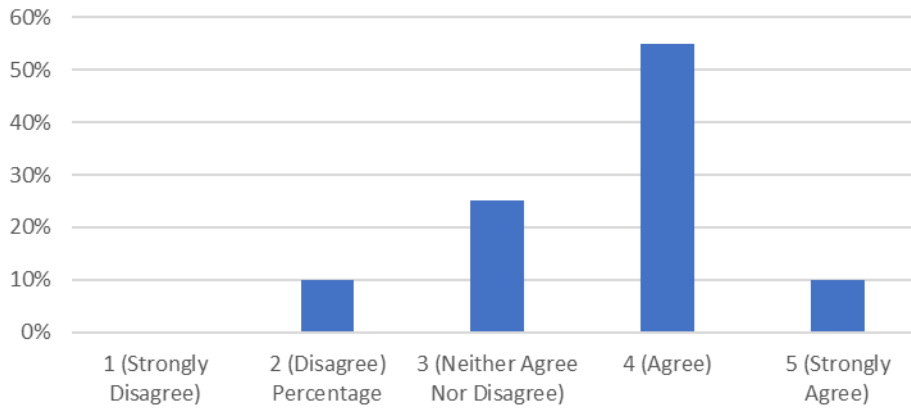| Participants	Total	1 - Skilled technical and academically qualified: workers, junior management, and supervisors	2 - Professionally qualified: experienced specialists and middle management	3 - Top management, senior management	TOTAL
Position Level	**20**	45%	50%	5%	**100%**

Participation by Postion Level
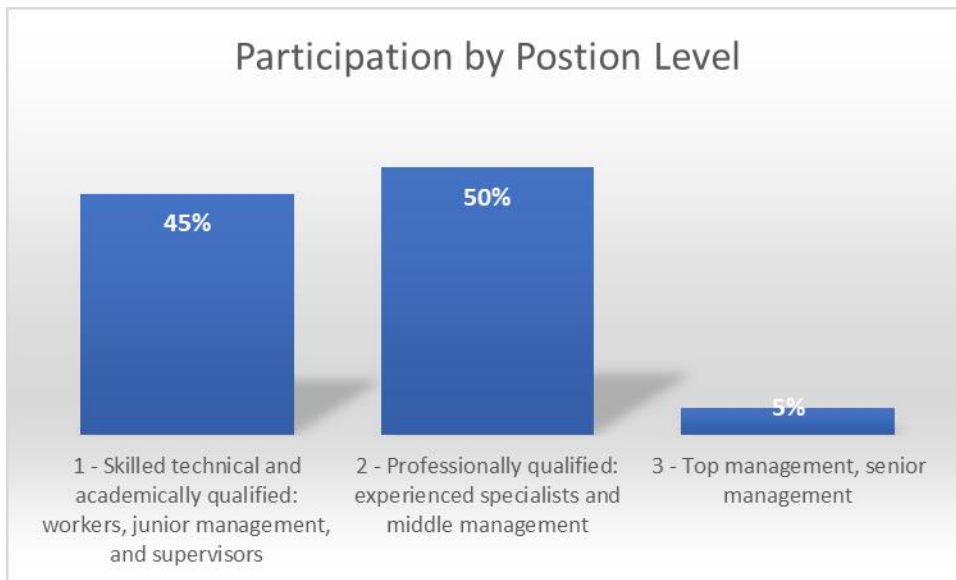
Appendix D: Organisational setting questions, responses, and analysis

Questions	Total	1 (Strongly Disagree)	2 (Disagree) Percentage	3 (Neither Agree nor Disagree)	4 (Agree)	5 (Strongly Agree)	TOTAL
Question_1	20	5%	15%	20%	60%	0%	100%
Question_2	20	0%	15%	55%	25%	5%	100%
Question_3	20	0%	20%	25%	40%	15%	100%
Question_4	20	0%	20%	25%	45%	10%	100%
Question_5	20	0%	10%	25%	55%	10%	100%
Question_6	20	0%	5%	15%	45%	35%	100%
Question_7	20	0%	25%	40%	20%	15%	100%
Question_8	20	0%	20%	40%	40%	0%	100%
Question_9	20	0%	20%	35%	35%	10%	100%
Question_10	20	5%	25%	25%	35%	10%	100%

Question 1: There is proper planning for ERP implementation projects.

Question 2: Everyone in the organisation shares a clear vision for ERP system implementation

Question 3: The organisation clearly communicates their ERP system implementation strategy

Question 4: The organisation clearly communicates how their ERP system implementation strategy will impact their operations and assist the organisation in achieving its objectives
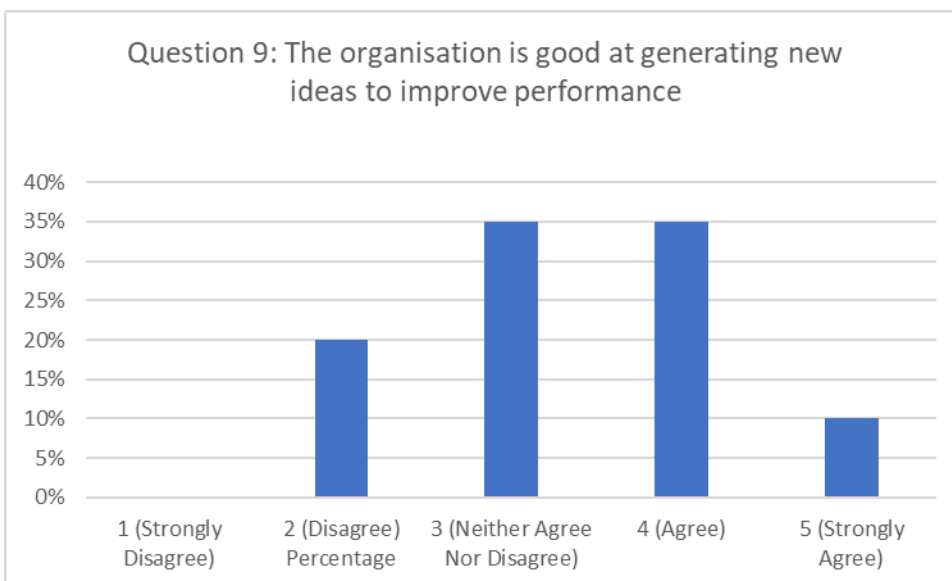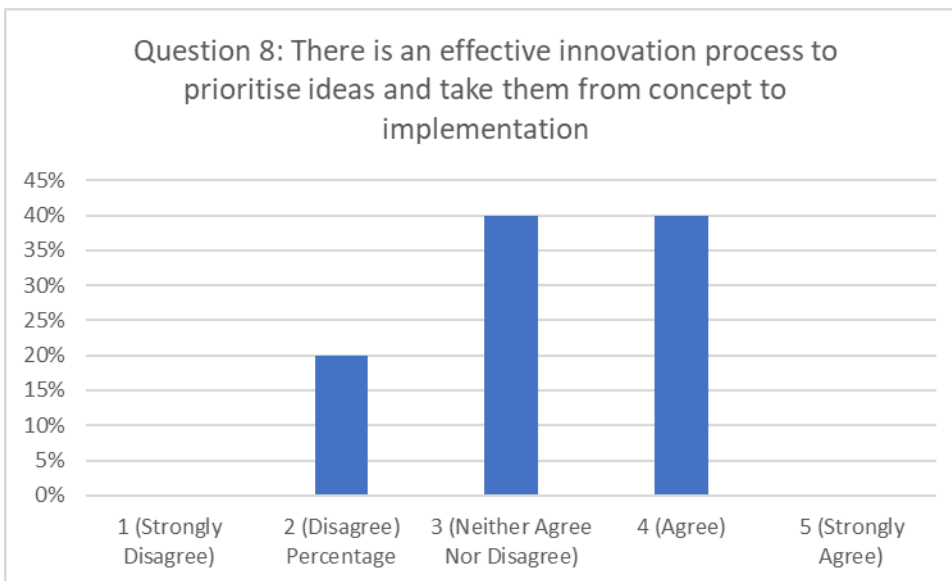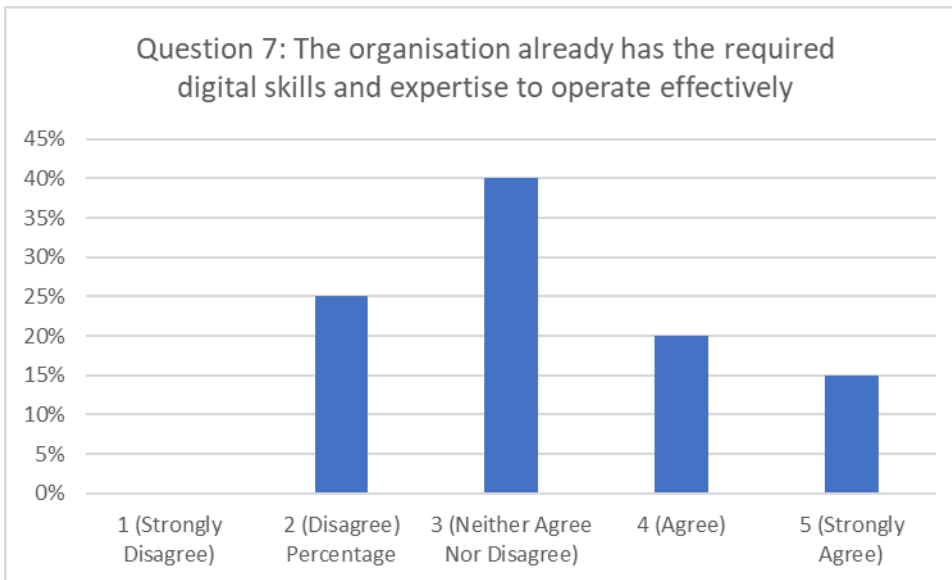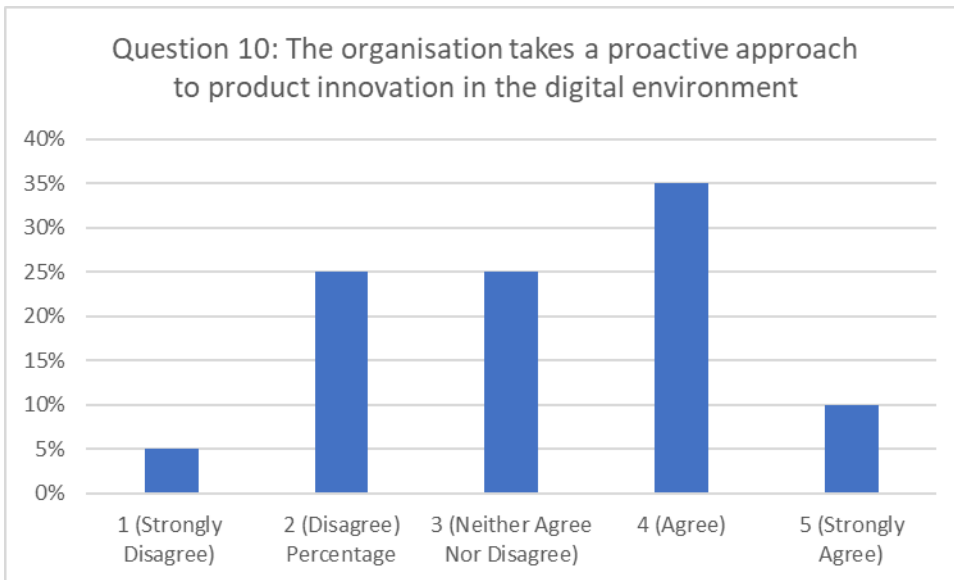
Question 5: The organisation has a clear understanding of how ERP systems can enhance its competitive environment

A bar chart showing percentages for Question 5:
- 1 (Strongly Disagree): 0%
- 2 (Disagree) Percentage: 10%
- 3 (Neither Agree Nor Disagree): 25%
- 4 (Agree): 55%
- 5 (Strongly Agree): 10%

Question 6: There is Senior Management Support for the successful implementation of ERP systems, to manage the organisation's transformation and change
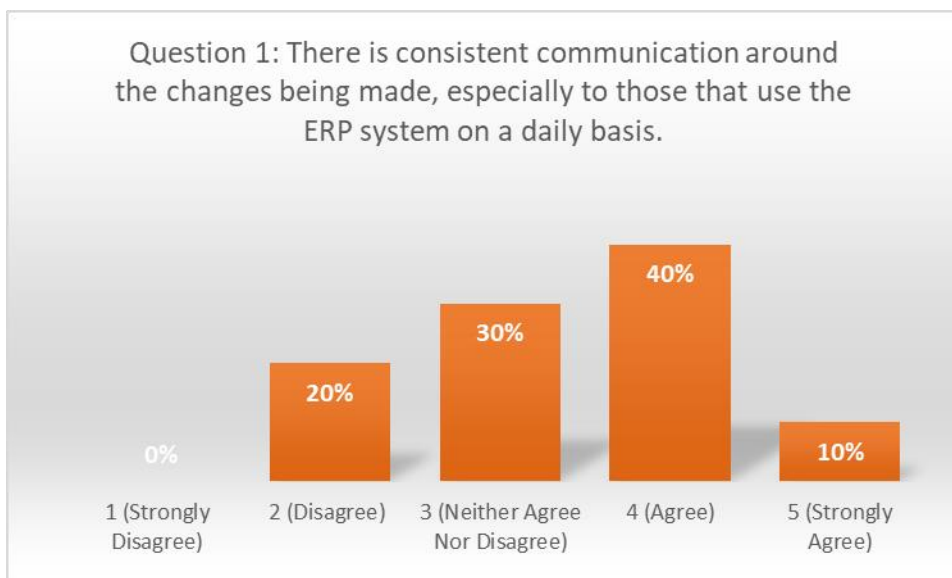
A bar chart showing percentages for Question 6:
- 1 (Strongly Disagree): 0%
- 2 (Disagree) Percentage: 5%
- 3 (Neither Agree Nor Disagree): 15%
- 4 (Agree): 45%
- 5 (Strongly Agree): 35%

Question 7: The organisation already has the required digital skills and expertise to operate effectively

Question 8: There is an effective innovation process to prioritise ideas and take them from concept to implementation

Question 9: The organisation is good at generating new ideas to improve performance

Question 10: The organisation takes a proactive approach
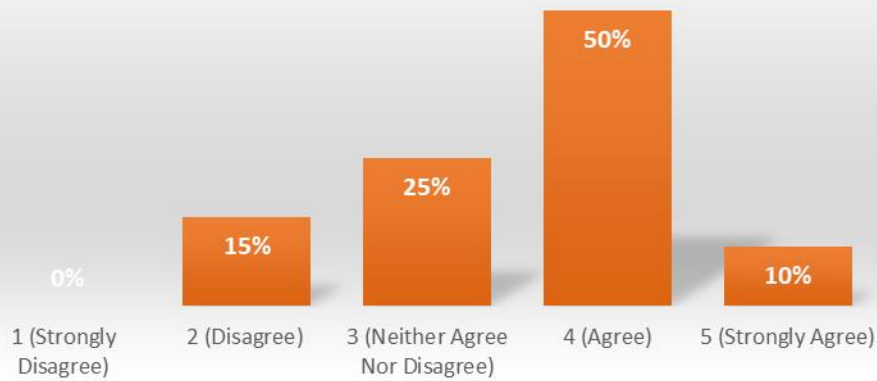to product innovation in the digital environment

Appendix E: Environmental setting questions, responses, and analysis

Questions	TOTAL	1 (Strongly Disagree)	2 (Disagree)	3 (Neither Agree nor Disagree)	4 (Agree)	5 (Strongly Agree)	TOTAL
Question_1	20	0%	20%	30%	40%	10%	100%
Question_2	20	0%	15%	25%	50%	10%	100%
Question_3	20	0%	20%	15%	45%	20%	100%
Question_4	20	0%	5%	65%	30%	0%	100%
Question_5	20	0%	15%	30%	40%	15%	100%
Question_6	20	0%	5%	20%	70%	5%	100%
Question_7	20	0%	5%	25%	50%	20%	100%
Question_8	20	0%	15%	15%	65%	5%	100%
Question_9	20	0%	0%	15%	50%	35%	100%

Question 1: There is consistent communication around the changes being made, especially to those that use the ERP system on a daily basis.
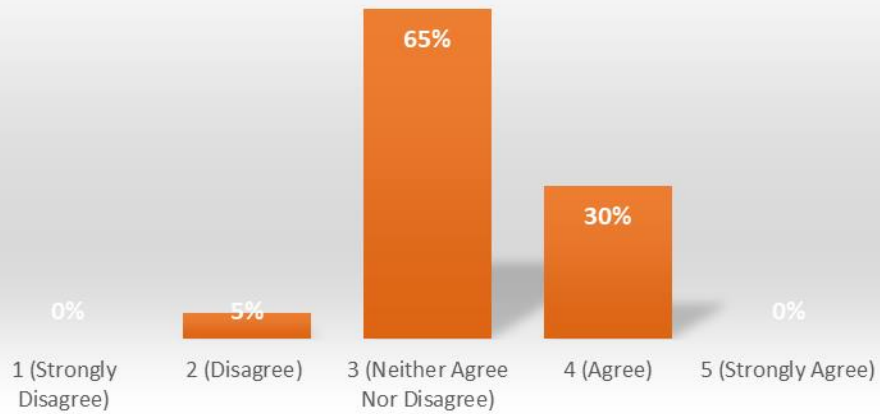
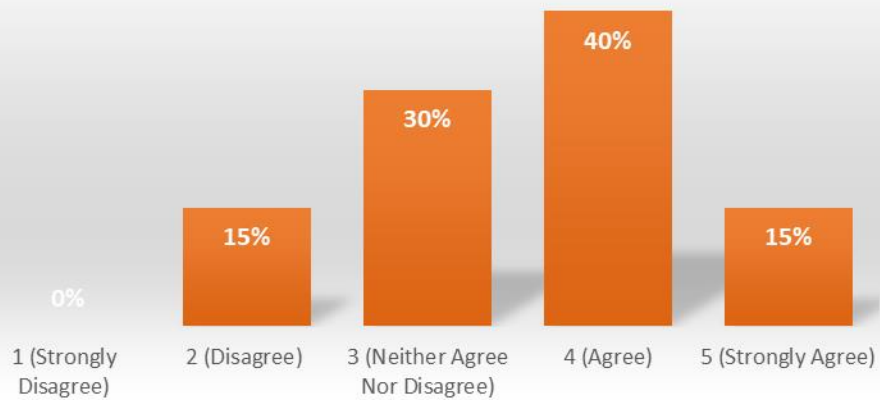Question 2: We share the same culture of working in the organisation

Question 3: There is a strong commitment to training and development of people when new ERP systems are introduced.
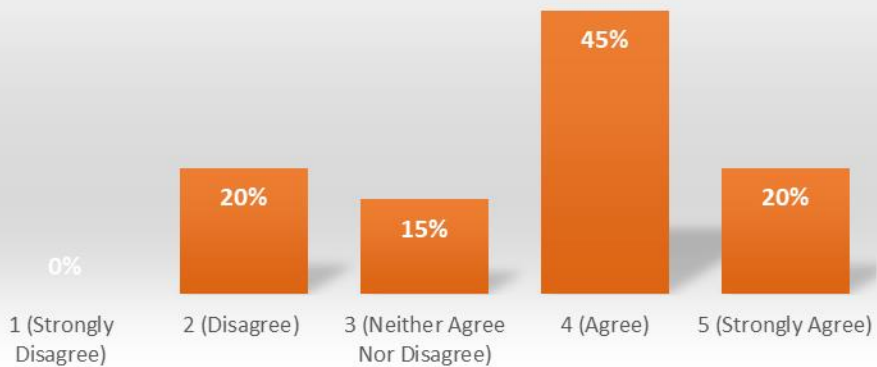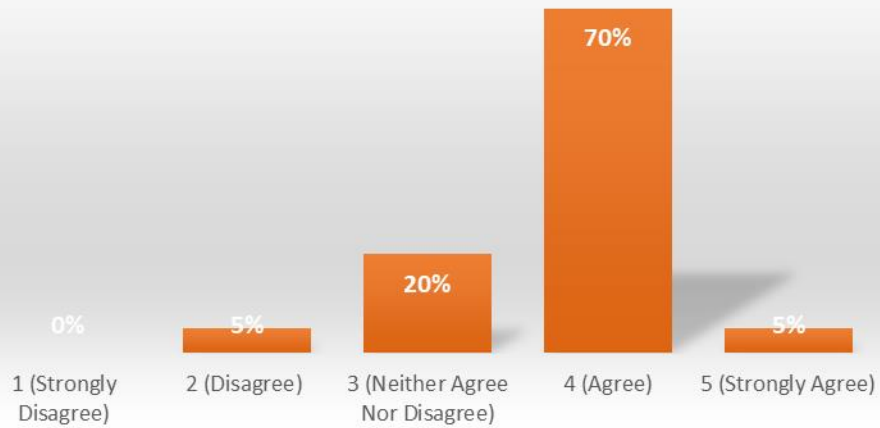
Question 4: The team is not penalised for making mistakes

- 1 (Strongly Disagree): 0%
- 2 (Disagree): 5%
- 3 (Neither Agree Nor Disagree): 65%
- 4 (Agree): 30%
- 5 (Strongly Agree): 0%

Question 5: Communication is effective across the organisation

- 1 (Strongly Disagree): 0%
- 2 (Disagree): 15%
- 3 (Neither Agree Nor Disagree): 30%
- 4 (Agree): 40%
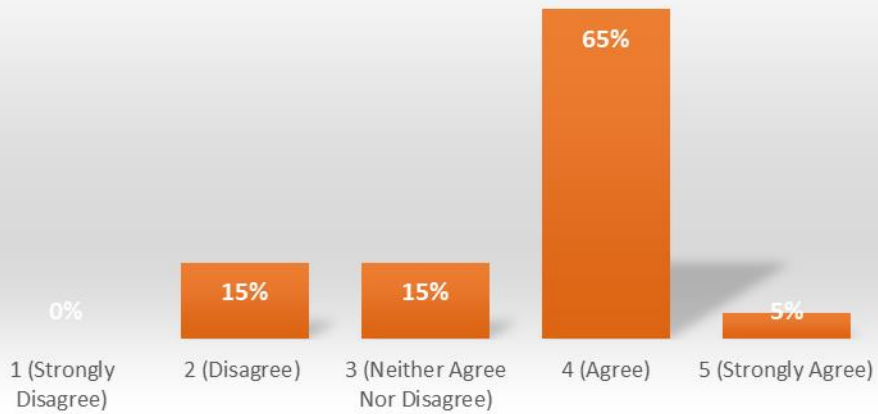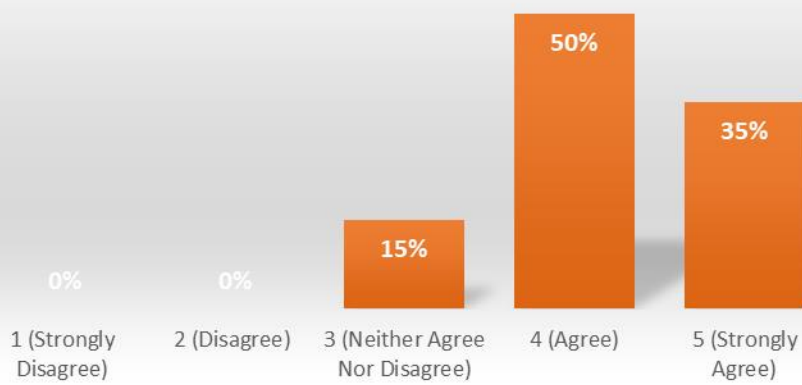- 5 (Strongly Agree): 15%

Question 6: We work well in teams

Question 7: The organisation supports teamwork and also allows people to express their individualism
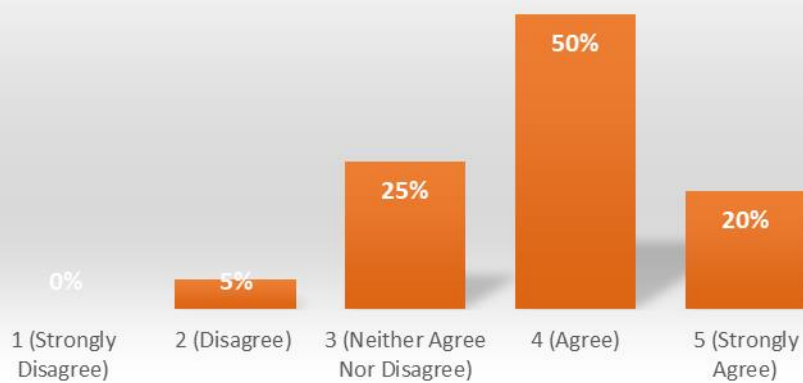
Question 8: People are involved in suggesting ideas for improvements to products and processes

1 (Strongly Disagree)	2 (Disagree)	3 (Neither Agree Nor Disagree)	4 (Agree)	5 (Strongly Agree)
0%	15%	15%	65%	5%

Question 9: Culture influences the way we do things in the organisation

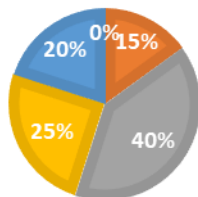| 1 (Strongly Disagree)	2 (Disagree)	3 (Neither Agree Nor Disagree)	4 (Agree)	5 (Strongly Agree)
0%	0%	15%	50%	35%

Appendix F: Technological setting questions, responses, and analysis

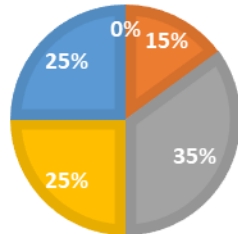| Questions	Total	1 (Strongly Disagree)	2 (Disagree)	3 (Neither Agree nor Disagree)	4 (Agree)	5 (Strongly Agree)	TOTAL
Question_1	20	0%	15%	40%	25%	20%	100%
Question_2	20	0%	15%	35%	25%	25%	100%
Question_3	20	0%	25%	15%	45%	15%	100%
Question_4	20	0%	5%	35%	50%	10%	100%
Question_5	20	0%	20%	25%	50%	5%	100%
Question_6	20	5%	15%	30%	45%	5%	100%
Question_7	20	0%	0%	40%	50%	10%	100%
Question_8	20	0%	5%	50%	35%	10%	100%

QUESTION 1: OUR ORGANISATIONAL STRUCTURE SUPPORTS NEW WAYS OF WORKING, FOR EXAMPLE NEW ERP SYSTEM FOR A MORE EFFECTIVE WAY OF WORKING

- 1 (Strongly Disagree)
- 2 (Disagree)
- 3 (Neither Agree Nor Disagree)
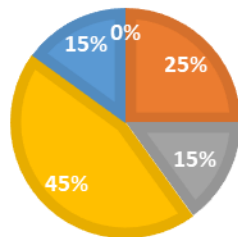- 4 (Agree)
- 5 (Strongly Agree)

QUESTION 2: THE ORGANISATION HAS QUALITY, GOOD INTEGRITY DATA THAT ENABLES EFFECTIVE DECISION MAKING

- 1 (Strongly Disagree)
- 2 (Disagree)
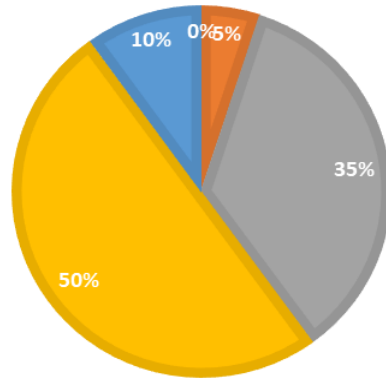- 3 (Neither Agree Nor Disagree)
- 4 (Agree)
- 5 (Strongly Agree)

QUESTION 3: OVERALL, THE ORGANISATION'S ERP SYSTEMS ARE WELL INTEGRATED AND STREAMLINED WHERE POSSIBLE

- 1 (Strongly Disagree)
- 2 (Disagree)
- 3 (Neither Agree Nor Disagree)
- 4 (Agree)
- 5 (Strongly Agree)

QUESTION 4: WE HAVE PROCESSES IN PLACE TO HELP US MANAGE NEW ERP SYSTEMS FROM DEVELOPMENT TO LAUNCH

- ■ 1 (Strongly Disagree)
- ■ 2 (Disagree)
- ■ 3 (Neither Agree Nor Disagree)
- ■ 4 (Agree)
- ■ 5 (Strongly Agree)

Pie chart values: 0%, 5%, 35%, 50%, 10%

QUESTION 5: THE ORGANISATION'S ERP SYSTEMS ARE EFFECTIVE AND EASY TO USE

- ■ 1 (Strongly Disagree)
- ■ 2 (Disagree)
- ■ 3 (Neither Agree Nor Disagree)
- ■ 4 (Agree)
- ■ 5 (Strongly Agree)

Pie chart values: 0%, 20%, 25%, 50%, 5%
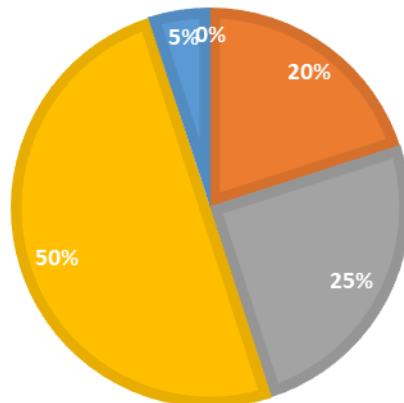
QUESTION 6: THE ORGANISATION ENGAGES IN EFFECTIVE RE-ENGINEERING OF BUSINESS PROCESSES

Pie chart values: 5%, 5%, 15%, 30%, 45%

- 1 (Strongly Disagree)
- 2 (Disagree)
- 3 (Neither Agree Nor Disagree)
- 4 (Agree)
- 5 (Strongly Agree)
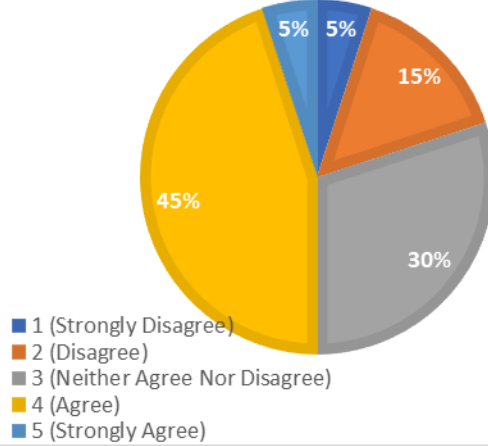
QUESTION 7: ERP IMPLEMENTATION PROJECTS ARE MANAGED EFFECTIVELY

- 1 (Strongly Disagree)
- 2 (Disagree)
- 3 (Neither Agree Nor Disagree)
- 4 (Agree)
- 5 (Strongly Agree)

Pie chart values: 10%, 0%, 40%, 50%

QUESTION 8: THE ORGANISATION HAS EFFECTIVE CHANGE MANAGEMENT STRATEGIES

- ■ 1 (Strongly Disagree)
- ■ 2 (Disagree)
- ■ 3 (Neither Agree Nor Disagree)
- ■ 4 (Agree)
- ■ 5 (Strongly Agree)

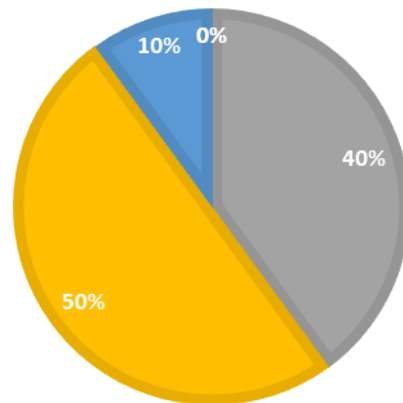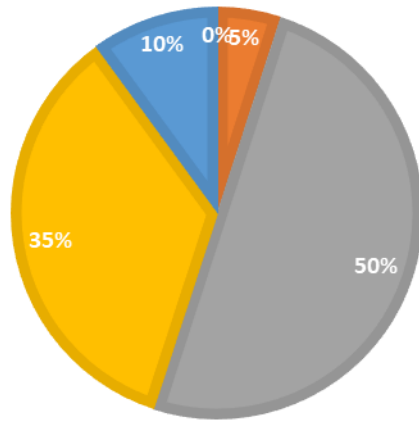|	Question	Participant 1	Participant 2	Participant 3	Participant 4
1	Can you briefly provide a short depiction of your position in relation to ERP implementation in the organisation?	"Responsible for testing the ERP solutions."	"Product Head, looking after BEE reporting and funding."	"I am in charge of the Technical QA Testing of all ERP systems enterprise wise."	"Not involved"
2	What are the factors that influenced the adoption of ERP systems in large organisations in South Africa?	"Need for integration and centrality of organisational data Need to run banking, HR, pension, payroll."	"Cost, ease of maintenance."	"Choosing the right ERP, as well as ensuring its security and quality assurance."	"Governance processes. Willingness to change and adopt new ways of work."

	Question	Participant 1	Participant 2	Participant 3	Participant 4
3	What are the kind of challenges you have come across when implementing ERP systems in the organisation?	"Program/project planning; "inept following of the SDLC"; a lack of internal technical resources to drive implementation; and a lack of communication across various implementation teams."	"Skill to maintain and innovate on the ERP platform."	"Timelines. PMO pushing to implement too quickly before all activities are in place Implementation of ERP modules that are not necessary."	"Same as 2."
4	Does the organisation follow any guidelines when adopting and implementing these ERP systems in the organisation?	"Not that I know off."	"Yes."	"The organisation does have guidelines on ERP implementation."	"Unsure."
5	What is the current state of adoption/implementation of ERP systems in the organisation?	"Quite good."	"Very High."	"Digitisation is taking place within the organisation. ERP adoption is rapid within the organisation."	"Unsure."

	Question	Participant 5	Participant 6	Participant 7	Participant 8
1	Can you briefly provide a short depiction of your position in relation to ERP implementation in the organisation?	"The introduction of ERP in our organisation helped to integrate systems, and that led to improved turnaround time in service delivery."	"Tester- Testing of the software to determine its quality."	"Testing the ERP application to ensure that it's working according to the company's need."	"I am a user."
2	What are the factors that influenced the adoption of ERP systems in large organisations in South Africa?	"An efficient way of managing service delivery, be it payments, recruitment, communication etc. Centralised systems like ERP help bring the organisation's entities into synch with one another. It is much easier to share knowledge and understanding of common goals within an organisation."	"To have 360 degrees view of the company data from one central view."	"The ability to merge company programs into one, making it easy to access information."	"Size, budget."

	Question	Participant 5	Participant 6	Participant 7	Participant 8
3	What are the kind of challenges you have come across when implementing ERP systems in the organisation?	"Integrating systems into the ERP It requires special knowledge for the users of the system. Technological expertise was an issue, and we needed to get outside expertise to get us through."	"People adoption of the system."	"Resistance to change."	"Recovery testing."
4	Does the organisation follow any guidelines when adopting and implementing these ERP systems in the organisation?	"Yes, we were guided by the basic industry-wide principles of implementing the solution."	"Yes."		"Yes."
5	What is the current state of adoption/implementation of ERP systems in the organisation?	"Stable and gradual growth."	"Still in the early phases."	Yes	"Mature."

	Question	Participant 9	Participant 10	Participant 11	Participant 12
1	Can you briefly provide a short depiction of your position in relation to ERP implementation in the organisation?	I am in a quality management area, and my position is to ensure the ERP implementations have met the required requirements and passed all the quality gates to ensure successful implementation	No Answer Provided	No Answer Provided	"I do not get involved in ERP implementation as I am the user."
2	What are the factors that influenced the adoption of ERP systems in large organisations in South Africa?	"One of the elements that may influence ERP system adoption is business complexity. Another two factors could be the structure as well as the organisation's size."	No Answer Provided	No Answer Provided	"User involvement Employees and/or user skilling (IT skills) Top Management support."

	Question	Participant 9	Participant 10	Participant 11	Participant 12
3	What are the kind of challenges you have come across when implementing ERP systems in the organisation?	"Customization of the ERP systems to fit the culture of the organisation not implementing best-recommended practices."	No Answer Provided	No Answer Provided	No Answer Provided
4	Does the organisation follow any guidelines when adopting and implementing these ERP systems in the organisation?	"Most organisations discard the guidelines when adopting and implementing the ERP systems."	No Answer Provided	No Answer Provided	"Yes"
5	What is the current state of adoption/implementation of ERP systems in the organisation?	"In the current organisation, ERP system is adopted, and all the modules are being used."	No Answer Provided	No Answer Provided	No Answer Provided

	Question	Participant 13	Participant 14	Participant 15	Participant 16
1	Can you briefly provide a short depiction of your position in relation to ERP implementation in the organisation?	"I have played a technical role during the implementation of ERP, and I have used the ERP system after implementation. Currently, I use the ERP application to fulfil some management roles and for other functions with the organisation."	"My position is testing the ERP before it can be implemented for Users."	"I was part of the initial implementation, but now I am just an interested stakeholder and the end-user of the system."	"I am only a user of the system and, therefore, no comment."
2	What are the factors that influenced the adoption of ERP systems in large organisations in South Africa?	"It is the prices, support, and availability skills to support the ERP system."	"Ease of Use, some ERPS are too complex for End Users."	"There is a need to streamline organisational processes and connect many technologies into a single platform where transactions can be completed end to end and all phases of the workflow can be monitored."	"I am only a user of the system and, therefore, no comment."

	Question	Participant 13	Participant 14	Participant 15	Participant 16
3	What are the kind of challenges you have come across when implementing ERP systems in the organisation?	When the team faces an issue and there is a vital milestone to meet, there is a lack of immediate response from the vendor.	Customisation to the meet organisational needs	Lack of appetite to adopt out-of-the-box standard processes. High levels of customisation. Lack of adoption because users tend to have specific preferences especially based on their previous experience at other organisations, e.g., SAP vs Oracle. Not articulating the strategic intent of the implementation with clear expectations and matrices to evaluate success or failure. Poorly planned projects result in delays and costs overruns.	I am only a user of the system and, therefore, no comment.

	Question	Participant 13	Participant 14	Participant 15	Participant 16
4	Does the organisation follow any guidelines when adopting and implementing these ERP systems in the organisation?	"They usually adhere to the recommendations and guidelines of Gartner and other reputable organisations. "	"Yes, they were following guidelines; however, with Technology, there are always glitches to be expected. Organisations are different."	"Always departs from the guidelines provided by the software supplier. Lack of adoption of standards processes and opting to customise the systems."	"I am only a user of the system and therefore no comment."

	Question	Participant 13	Participant 14	Participant 15	Participant 16
5	What is the current state of adoption/implementation of ERP systems in the organisation?	"The ERP system has been well accepted in the organisation, and people use it regularly."	"The ERP system is now operational, despite the fact that it took a long time to be fully implemented and operational. Customisation and user requirements were some of the delaying factors in the Implementation."	"Low. Service management and Asset management have now been implemented independently of the ERP system even though the modules have been licensed with the original implementation. There is a potential for Core banking being implemented independently of the ERP."	"I am only a user of the system and therefore no comment."

	Question	Participant 17	Participant 18	Participant 19	Participant 20
1	Can you briefly provide a short depiction of your position in relation to ERP implementation in the organisation?	"I am a user of the ERP system."	"Currently an end-user."	"There is not a resource Planning tool in the PA that I am aware of. Resource planning is done without looking at the demand and capability of the resource."	"I am a Senior Test Analyst. My responsibility is to ensure that the quality of the software is exceptional and responsible for other artefacts such as the Test Approach, Integration Testing, to co-ordinate the project test activities across streams, Test Control and Report, customer management and process implementation, to extract test requirements and create/ execute test scripts (manual and automation) Review and manage defects, Lead reviews of test requirements and Support the Project Manager and Business Operations Executive as required."

	Question	Participant 17	Participant 18	Participant 19	Participant 20
2	What are the factors that influenced the adoption of ERP systems in large organisations in South Africa?	"The organisation's culture and change management intervention"	"Ease of use, training."	"As organisations evolve, skills are evolving, and some skills become redundant Automation or Robotic is becoming the norm."	No Answer Provided

	Question	Participant 17	Participant 18	Participant 19	Participant 20
3	What are the kind of challenges you have come across when implementing ERP systems in the organisation?	"Poor adoption of the system"	No Answer Provided	No Answer Provided	"All ERP systems need to be maintained on a regular basis, which results in maintenance costs. An ERP system might appear inexpensive to start with but failing to factor in the maintenance costs attached to it before implementation can end up costing the organisation tremendous large amounts to pay. This is again another reason to properly vet your vendors prior to making a decision."

	Question	Participant 17	Participant 18	Participant 19	Participant 20
4	Does the organisation follow any guidelines when adopting and implementing these ERP systems in the organisation?	"Yes, Correct"	"Not sure"	"I strongly suggest that a framework be built and adopted by organisations for ERP planning."	No Answer Provided

	Question	Participant 17	Participant 18	Participant 19	Participant 20
5	What is the current state of adoption/implementation of ERP systems in the organisation?	"I think we have a high adoption rate at the moment as the platform is supported well."	"We have Oracle, which looks like it needs enhancing due to features that are not adequate."	"Non-existent at the present moment as far as I am aware."	"I am not sure at all".

Appendix H: Atlas.ti Word Cruncher of the responses from participants