# Investigating the point of readiness for manufacturing SMEs to implement an Enterprise Resource Planning system

**SJ du Plessis**

**orcid.org/0000-0001-8218-7021**

Mini-dissertation accepted in partial fulfilment of the requirements for the degree Master of Business Administration at the North-West University

Supervisor: Mr JC Coetzee

Graduation: June 2023

Student number: 23699930

# ACKNOWLEDGEMENTS

I would like to extend a special thank you and acknowledgement to the people that have supported me through my MBA with their contributions, guidance, and mentorship, allowing me to complete my study journey.

The following individuals I would like to personally thank and acknowledge:

- Firstly, I would like to thank the almighty God for allowing me this opportunity and giving me the guidance and strength to complete my MBA.
- Would like to specially say thank you to my wife Helizna who has supported me throughout this journey, giving constant encouragement, patience, and understanding.
- To my father who has supported and encouraged me throughout my studies and by assisting me with my workload.
- My supervisor Mr Johannes Coetzee, for your mentorship and for constantly motivating me.
- My study group for assisting me throughout my studies and for jointly motivation and encouragement.

# ABSTRACT

Small and medium enterprises (SMEs) play a very important role in the economy and the global economy, contributing to economic growth and job creation. Still, they are constantly receiving pressure to compete with constrained resources. Enterprise resource planning (ERP) systems are known to improve business performance. Unfortunately, the adoption of a proprietary ERP system is coming at great costs which are draining the financial resources of SMEs. Most SMEs do not know how to properly implement such a system as well as to properly make use of all the benefits.

SMEs find it difficult to determine their point of readiness to implement an ERP system considering the large costs of implementation and the change it will bring to the company. Due to a variety of different implementation options available, deciding which ERP system to implement becomes even more difficult. However, with easier guidelines to determine their readiness point will be beneficial.

The adoption of open-source ERP systems is presenting the opportunity for SMEs to overcome the cost factor. The use of open-source software has increased in the past few years and the use of open-source ERP systems. Open source is offering the same functions as proprietary systems but with no purchase value. Unfortunately, it does not remove the implementation costs but is still much more affordable. Still, the adoption of open-source ERP systems is extremely low among SMEs considering the huge benefits they are offering. Therefore, the technology of open-source ERP systems is available to SMEs to improve their business processes and improve their competitiveness.

A qualitative methodology was used in conducting this research with an interpretivist research paradigm. Semi-structured interviews were used in collecting the data for this study and were analysed and coded using an inductive approach. For this study, to determine the readiness point for SMEs to implement an ERP system, it was important

to look at all the factors associated with ERP implementation. These included looking at the benefits, challenges, barriers to adoption, forces to adoption and the critical success factors. This field of study to determine the readiness point has not been thoroughly explored which is specifically focussing on the SME sector.

**Keywords:** Barriers, Challenges, Change management, ERP, Implementation, North-West Province, Open-source, Readiness, SME.

## ABBREVIATIONS AND ACRONYMS

BPR – Business process reengineering

CSF – Critical success factor

ERP – Enterprise resource planning.

IoT – Internet of Things

IT – Information technology.

LIS – Legacy information system

PAIA – Promotion of Access to Information Act.

POPIA – the Protection of Personal Information Act.

ROI – Return on investment.

SAAS – Software as a service

SME – Small and medium-sized enterprises.

SMME – Small Medium and Microenterprises.

# TABLE OF CONTENTS

# LIST OF TABLES



# LIST OF FIGURES

# CHAPTER 1: INTRODUCTION AND PROBLEM STATEMENT

## 1.1. INTRODUCTION

Organisations with limited technological capabilities stretch to achieve a competitive edge by improving their operations to reduce costs and increase sales. Enterprise resource planning (ERP) systems are widely used in large organisations and some of them have managed to do so. ERP systems have become more affordable, and more open-source software is becoming available on the market which is enabling SMEs to also become competitive.

ERP systems are mostly known for two of their important characteristics, data integration and best practice processes. Data integration is meaning that data must only be entered once after which it is available throughout the organisation. Best practice processes are revering to ERP systems that capture the best processes from different organisations to deliver the best practical value for their organisation (Sneller, 2014:12-13). ERP implementations are undeniably risky due to most ERP implementations ending later than planned and costing more than expected. Other research also indicates that they do not attain their initial objectives (Sneller, 2014:85). In the case of Nestle, they have identified several different pitfalls which should be avoided. These are to choose the ERP package wisely, get management commitment, avoid customisation, and do proper and continuous training (Dieringer, 2004:2). For small companies, a lack of planning and overrunning costs could cause insufficient resources to complete implementation (Sneller, 2014:86).

ERP systems enable organisations to reduce costs by automating repetitive processes and increasing volumes across functional areas of the business. Increasing management benefits by improving real-time information, decision-making, and performance within the organisation. Increasing strategic benefits by achieving the competitive advantage through differentiation at lower costs, improving innovation, increasing Information Technology (IT) infrastructure, increase in supporting

organisational changes and employee empowerment (Shang & Seddon, 2000:1005-1006). Cloud ERP systems are still quite new and are enabling SMEs to acquire these systems with lower start-up costs because less capital for hardware is required such as a server. ERP systems are an improvement of operational systems. Operational systems do not necessarily support real-time information, integration, and automation. These factors become critical in the fast-moving business sector.

For this research, the data should be collected and presented up until November 2022 because of the fast movement of technology as stated by Moore's law and Gilder's law. Moor's law indicates that every 18 months computing power doubles (LI, 2013). Gilder's law indicates that bandwidth grows at least three times faster than computer power (Kocovic, 2008:141). Making the information valued for research purposes but some information may become irrelevant.

In this study, we will be determining the relationship between proprietary ERP systems, open-source ERP systems and the readiness of SMEs to implement. Furthermore, there are numerous opportunities and advantages as well as challenges and pitfalls of ERP systems. These will all be investigated to have a better understanding of what possibilities is lying ahead of SMEs as well as what to do to avoid failure in a case of implementation. Also, indicating the usefulness of these systems and how to ensure they are optimally utilised throughout the company.

In this study, the following will be discussed, a literature review of ERP and SMEs, the problem statement, the research objectives, the scope of the study, the research design and methods, ethical considerations, limitations of the study, the layout of the study and the timeframe.

## 1.2. BACKGROUND TO THE STUDY

Previous studies have been done on the topic of ERP systems in SMEs which had many different conclusions but also has a time difference between the past and the present which is a big factor in the fast technological development era. As technologies develop at a fast phase new opportunities arise for SMEs. Many of the previous studies have determined the benefits, challenges, and opportunities as well as the pitfalls in implementing ERP systems. But no clear conclusion regarding the readiness of SMEs to implement such a system has been determined. Through this study, new opportunities will be discovered, giving a much clearer indication of ERP possibilities and SME readiness.

SMEs are facing numerous challenges in highly competitive markets which are putting pressure on them to be competitive and responsive. SMEs can by adopting the appropriate ERP systems, achieve integration to have the correct information for quick and appropriate decisions (Alaskari *et al.*, 2021:424). ERP systems have become one of the most important and expensive implementations in the corporate use of IT over the past two decades (Alaskari *et al.*, 2021:425). To reduce costs, expand business initiatives and improve production capacities, SMEs will need to adopt innovations to boost business models (Zadeh *et al.*, 2018:1). It is emphasised that there is a need for manufacturing SMEs to consider the implementation of ERP systems even though the pitfalls are there. Thus, this study is to determine the readiness of SMEs to implement an ERP system in the present to avoid the catastrophic consequences of implementing it too soon.

## 1.3. PROBLEM STATEMENT

ERP systems are becoming, even more, of a requirement for manufacturing SMEs because they do start to compete with larger organisations as well as many other small organisations thus businesses that are still using operational systems have a lot of

limitations and do not offer all the advantages of a proper ERP system. Although SMEs are striving to get up to date with current technological trends such as ERP systems, it is found to be very risky and complex to implement (Kiran & Reddy, 2019:268). ERP systems have large offerings with many different possibilities and as it is, they show to be very promising in improving business operations, automatization of operational processes, improving real-time information, and giving a competitive advantage required to keep the competitive advantage. According to Motahar *et al.* (2018:2384), open-source ERP systems are becoming popular as an alternative to expensive proprietary ERP packages. These open-source software is opening the possibility for SMEs to acquire an ERP system without the costs of a proprietary ERP system.

The biggest concern is the expensiveness of these systems, for SMEs they are in most cases not affordable for SMEs and if so, such a large expense could financially cripple the business if not implemented correctly or if the wrong system is chosen (Jituri *et al.*, 2018:79). The performance of a firm could decrease during the implementation phase; thus, it could be several years before the desired Return on Investment (ROI) is reached. When considering an ERP system, the ROI should be measured in advance to justify the investment (Hunton *et al.*, 2003:170). ERP implementation failures are mostly due to a lack of resources, expertise, guidelines and knowledge (Jituri *et al.*, 2018:79). The purpose of SMEs to consider ERP systems is not only the benefit of integrating all functional departments but to automize processes that will lead to lean manufacturing aiming for zero waste. Customizations in ERP implementations have been done to meet the size and scales of operations in different organisations opening the possibilities for SMEs to implement an ERP system (Kiran & Reddy, 2019:268-269).

For SMEs, the problem remains that they do not have a clear indication of when their companies are ready to implement an ERP system, or they do not know how to determine their readiness. Also, SMEs having the pressure of implementing an ERP system to receive the benefits do not include the possibility of open-source ERP systems. With the possibility of taking up open-source software, SMEs could improve

on their competitive advantage. It is therefore important to determine why these open-source ERP systems have not been adopted by SMEs.

## 1.4. RESEARCH OBJECTIVES

### 1.4.1. Primary objective

The primary objective of this research is to explore the challenges, opportunities, and advantages of implementing an ERP system. Thus, determining the point of readiness of manufacturing SMEs to implement an ERP system as well as the possibilities of acquiring open-source ERP systems.

### 1.4.2. Secondary objectives

The structured secondary objectives are in support of the primary objective which includes to:

- Investigate the different challenges and pitfalls in implementing an ERP system.
- Investigate the different advantages and benefits of implementing an ERP system.
- Investigate the possibility of manufacturing SMEs to implement open-source ERP systems.
- Investigate the point of readiness for a manufacturing SME to consider the implementation of an ERP system.

By achieving the secondary objectives, it will be possible to ultimately achieve the primary objective. By achieving the primary objective, the point of readiness will be determined but should still consider managing the change such a system will bring to the organisation.

## 1.5. SCOPE OF THE STUDY

### 1.5.1. Field of study

ERP systems are becoming an integral part of companies giving many benefits, such as integrating all functional departments of an organisation. For SMEs, these systems are very expensive and could cause financial losses. Thus, the focus will be on open source as well as proprietary ERP systems made for SMEs. Aiming the study to determine the readiness as well as challenges of adopting an ERP system and to explore open-source possibilities.

### 1.5.2. Sector/industry/business under investigation

This study will be performed in the manufacturing industry in the SME sector. The businesses under investigation will be SMEs that are busy implementing or are considering implementation or have already successfully implemented an ERP system to draw the successes.

### 1.5.3. Geographical demarcation

This study will be performed in the North-West province on manufacturing SMEs which has already implemented an ERP system or is busy implementing or are considering implementing such a system. These areas will be specific manufacturing hubs in the North-West province such as Potchefstroom, Klerksdorp and Rustenburg.

## 1.6. RESEARCH METHODOLOGY

### 1.6.1. Empirical research

Having a good research design is important to ensure that the research objectives are being solved in an effective and efficient way. For this research, a qualitative research

method will be used to determine the readiness of SMEs to implement an ERP system. According to Bryman and Buchanan (2018:2) qualitative information is rich which can be captured from a small number of respondents

For the primary and secondary objectives to be achieved of this study the empirical research was done by using the following process:

**i. Study population**

This study was done on selected manufacturing SMEs considering or which have already implemented an ERP system, within the North-West province, specifically in Potchefstroom, Klerksdorp and Rustenburg. The interviews were primarily done with the company's owner or head of IT, whichever had the most knowledge of their IT systems.

**ii. Construction of the interviews**

The focus was on to design the interview questions by focussing on the following five questions:

- Does the company have the financial, technological, and human resources available to implement or had available when implementing an ERP system?
- What would be the reasons for ERP implementation?
- What are the challenges and barriers to ERP implementation?
- What would the benefits be for implementing an ERP system?
- When will a company be ready to implement an ERP system?

**iii. Gathering and analysis of data**

Interviews was held with the selected companies to collect data until saturation was reached. The interviewees were contacted by telephone to confirm participation with this study. After participation was agreed upon, the consent form was sent to the interviewee prior to the interview, explaining the purpose and background to the study. All the interviews were coded and analysed to reach a conclusion, where the complete report will be forming part of this document.

### 1.6.2. Sources

For this study the literature review was limited to the following resources:

- Scholarly Books.
- Academic articles, Scholarly documents, and journals.
- At the time of the research, what was available on the internet.

### 1.6.3. Research

A qualitative research approach was used for this study to determine the readiness for a manufacturing SME to implement an ERP system. The researcher had a moral duty to protect the confidentiality of the data gathered, therefore the researcher handled the data with utmost respect. This study adhered to all the required ethical standards. The interviewees had the option to stop participating during or after the interview took place at a reasonable time before the submission date. The interviews were conducted voluntarily and the consent form which includes the background and purpose to the study were made available prior to the interviews.

## 1.7. CONTRIBUTION OF THE STUDY

The purpose of this study is to determine the challenges, opportunities, and advantages of implementing an ERP system and by doing so it will be possible to determine the readiness of the organisation to implement this type of system. For many SMEs that are growing at a fast pace and labour becoming expensive in South Africa, their current operating systems are becoming more redundant and cannot uphold the operational requirements. Thus, they are forced to consider other larger systems or implement an ERP system that will satisfy the operational requirements and as well improve their competitive advantage. For SMEs to determine their readiness through other personal meanings can become confusing and that is why an in-depth study must

be done to determine an accurate readiness for SMEs to implement an ERP system. Many SMEs have implemented ERP systems but have failed because of financial constraints and because they were not ready or did not have the necessary skills to maintain such a system or change management was not done effectively. That is why it is necessary to conduct this study to ensure the correct decision are made and to be informed of what needs to be done to ensure successful implementation.

## 1.8. EXPECTED LIMITATIONS OF THE STUDY

Limitations of a study are the design or shortcomings of the study that will have an impact on the interpretation of the findings. The first limitation is that research will only be conducted in the North-West with SME manufacturing companies, where this research will differ from other provinces. Secondly, there is no available database to draw the study population from thus it will be sourced by the researcher. Thirdly, non-probability interviews are used to have the convenience and to keep costs low but are a less stringent method. Fourthly, the small number of interviews will be taken due to the difficulty to find manufacturing SMEs that have implemented or is busy implementing or are considering the implementation of an ERP system. Lastly the issue of fast technological developments and this being a study of technology, the study will only be accurate until the data will be gathered.

In this case, being a student there are common limitations of available resources and time. Resources are quite low, and time is very much constrained.

## 1.9. LAYOUT OF THE STUDY

The layout of the study will give a representation of how the process of this research will flow. This study will consist of five chapters that will be set out as follows.

Chapter 1 – Introduction: It will consist of a problem statement that will be highlighting the reason for this study, the study objectives that will show the intended outcomes of

this study, the scope of the study, geographical demarcation, and the research methodology of the study.

Chapter 2 – Literature review: This chapter will highlight the historical overview of ERP systems and SMEs showing the definition of an ERP system and SME, the advantages and disadvantages of implementing ERP systems, and benefits as well as pitfalls of previous implementations. In this chapter, the focus will be on determining the academic discourse that is drawn from different scholars.

Chapter 3 – Empirical study: The sampling methods utilized, and the creation of the survey instrument are covered in this chapter's presentation of the study methodology. Additionally, the investigation's findings are displayed and discussed.

Chapter 4 – In this final chapter, the study's findings based on the literature review and empirical investigation are presented, along with suggestions for additional research.

## 1.10. CONCLUSION

Examining the literature review and the problem of this study it has become clear that SMEs will require to do extensive research on their organisations before implementing an ERP system due to all the factors that play a role. Irresponsible preparation and implementation could have catastrophic implications and can cost the sustainability of the SME but on the other hand, when the organisation is ready and does it correctly paying attention to all the necessary implementation factors it could be successful and achieve the competitive edge. Furthermore, as set out above it will be an intensive process in collecting and analysing the data collected from the participants and to ensure that all ethical procedures are being followed. Following the data collection and analysis planning will result in workable data for analysis.

## 1.11. CHAPTER SUMMARY

In this chapter, the numerous advantages, challenges and opportunities of ERP adoption have been indicated but also the risks involved with ERP adoption. For SMEs, there is no doubt that ERP adoption will improve business processes, but it must be done right at the right time. The major drawback of ERP adoption is the high costs of proprietary systems as well as incorrect implementations. The cost factor can be overcome with open-source ERP systems, but the adoption of open-source ERP systems is very low.

Factors causing low adoption of open-source ERP systems are mainly due to a lack of general awareness of open-source software and a lack of skills within SMEs. Proprietary vendors are in all sense trying to keep open-source tools unknown to SMEs.

The main causes of ERP implementation failures are a lack of knowledge within the company. Manufacturing SMEs do not know what to look for or how to determine whether they are at the point of readiness when considering an ERP adoption as well as what to manage within the company to prevent failure. They also do not ensure proper planning or budgeting which causes failure in execution or insufficient resources to complete.

Thus, all the benefits and advantages are well known when adopting an ERP system. But it will be important to determine how to adopt an ERP system whilst overcoming the challenges and avoiding the risks involved. It will also be important to determine what the barriers are toward open-source ERP adoption and what the adoption patterns are within SMEs.

# CHAPTER 2: LITERATURE REVIEW

## 2.1. INTRODUCTION

In chapter one, the need for SMEs to consider ERP systems has been highlighted with the benefits and opportunities that arise through ERP implementation. It has also highlighted the challenges and risks brought forward by ERP implementation. The main benefits that an ERP system has are organisational integration and improving automation. Within SMEs and ERP integration and automation, ERP systems is about improving the organisations overall efficiency and improving on customer service from an IT point of view. With all the different advantages, SMEs do not have a high uptake with ERP implementation mainly due to a lack of knowledge considering the benefits and when their organisation is ready for such a system. If SMEs have better knowledge of ERP systems, it will also assist them in determining their organisation's point of readiness for ERP implementation.

In chapter two the research objectives will be addressed through a literature review, with the following being the secondary research objectives:

- Explore the different challenges and pitfalls in implementing an ERP system.
- Investigate the different advantages and benefits of implementing an ERP system.
- Investigate the possibility of manufacturing SMEs to implement open-source ERP systems.
- Investigate the point of readiness for a manufacturing SME to consider the implementation of an ERP system.

This literature study will give a broad description of ERP systems and will aim to determine how ERP systems, proprietary systems and open-source systems have been integrated into SMEs. This chapter will discuss all the benefits SMEs will obtain through ERP as well as all the challenges and success factors. The barriers to ERP implementation will be discussed to have a clearer idea of why SMEs do not find ERP implementation attractive. Most importantly the literature will indicate what factors are

triggering SMEs to consider ERP implementation. An attempt in this literature study will be to show the point of readiness for an SME to adopt an ERP system. With open-source tools being quite unpopular the literature will give some clarity on why organisations do not make use of open-source software.

## 2.2. ERP SYSTEMS

ERP systems are application software which replaces in-house developed systems (Savelkouls *et al.*, 2017:2). In simple terms an ERP system is a type of software but the main difference between ERP software and simple software is that an ERP system consists of different modules and integrates these modules through the whole organisation. Thus, ERP is a multi-module application software package which integrates key business processes (Khaleel & Alkhaldi, 2017:41). According to some of the ERP system suppliers such as SAP, Baan, PeopleSoft, Oracle and so on, an ERP system has 12 different modules which can be integrated. The most important modules in ERP systems are sales and distribution, production planning, marketing, material management, project management, cost control and finance (Sari & Santoso, 2021:1). SMEs can consider only buying or using the ERP modules which are required by their organisation as the more modules are required the more expensive the system becomes. ERP systems are considered in many organisations to it being the backbone of many different enterprises to achieve a competitive advantage over competitors. Much research has been focused on implementing ERP systems in SMEs due to the complexity and risks involved to implement ERP systems in enterprises (Kiran & Reddy, 2019:268).

An ERP system can be revered as an integrated and cross-functional system that is assisting in managing all the operations of the enterprise. ERP systems assist the organisation in reducing costs, maximizing profits, improving quality, reducing the time-to-market, improving communications and higher productivity (Abd Elmonem *et al.*, 2016:1). An ERP system assists to break down the information between marketing, sales, HRM, finance, engineering, materials, planning, production, inventory, and all

the other functional departments within the organisation and assists to integrate all these departments. Thus, it is better to drive all functionalities in an integrated fashion rather than using separate applications for each department (Kiran & Reddy, 2019:268-269). It is noticed that the main benefits of ERP systems are the possibilities of integration and automation. When considering an ERP system, the costs and the ROI should be considered.

## 2.3. ERP SYSTEM COSTS AND ROI

The costs of implementing an ERP system are very high, especially for SMEs. From the total costs of ERP implementation within SMEs, the licencing costs of an ERP system are approximately 43% to 45% and implementation and programming costs approximately 40%. The four costs to be expected for an ERP system will be software licence costs, maintenance costs yearly, infrastructure and hardware costs and implementation costs. There are various hidden costs and insufficient planning could cause an overrun of the budget (Nikitović & Mahmutović, 2019:1315-1316). The specific costs of ERP implementation are quite vague due to each company having different requirements.

SMEs are tending to perceive an ERP implementation as a cost rather than an investment, thus, they are sceptical between affordability and instant returns. SMEs struggle to justify the worth of an ERP system in relation to operational efficiency (Bharathi & Yl, 2012:6). Furthermore, according to Bharathi and YL (2012:6) there are four different ways in which the ROI can be determined:

1. Determine the costs and the benefits and by gathering this information, it is possible to make an intelligent comparison.
2. ROI = benefits - costs. One of the simple ways is to subtract the costs of the benefits.
3. ROI = benefits / costs. This is expressed in terms of a ratio, similar to return on assets and return on sales.

4. ROI = benefits - costs / costs. This is also expressed in a ratio.

From the above formulations, the costs include direct costs, overhead costs, and long-term costs. From these different formulations, the ROI can be determined for an organisation. ERP systems can be acquired in a few different ways.

## 2.4. ERP DEPLOYMENT ALTERNATIVES

ERP systems can be accessed in three different ways such as an on-site server, a hybrid server, or cloud-based. Cloud-based ERP systems are based on an integration of the Internet of Things (IoT) and an ERP system where the IoT is described as a world where everything has a digital identity for itself and enables computers to manage and organize things. The IoT are creating a connection between the product and the customer (Tavana *et al.*, 2020:2-4). In all three ways, the main purpose of the system will be achieved but there are a few benefits and challenges of choosing cloud-based systems over an onsite server. According to Abd Elmonem *et al.* (2016:1-9), the benefits and challenges of cloud-based systems are shown in table 2.1.

**Table 2. 1: Benefits and challenges of cloud-based ERP systems**

| Benefits: | Challenges: |
|---|---|
| | |
| Lower upfront costs. | High subscription expenses. |
| Lower operating costs. | Higher risks. |
| Faster to implement. | Many customization limitations. |
| Highly elastic. | Experience a loss of onsite IT assistance. |
| Increased focus on core competencies. | Has functionality limitations. |
| Has access to the latest technology. | Has hidden contract costs. |
| Has mobility. | Start-up support is expensive. |
| Costs are transparent. | |

| | |
|---|---|
| Automated sales. | |

**Source: Abd Elmonem *et al.* (2016:1-9)**

Cloud ERP systems are still quite a new technology which puts some trust issues forth for organisations. For SMEs, the high level of security is an advantage, as they cannot implement such standards themselves (Abd Elmonem *et al.*, 2016:1-9). Although there are some kind of benefits for SMEs, the security of an on-site ERP system is more secure (Lee & Wang, 2019:15). There are many different ERP products available in the market. Thus, must be selected carefully and mainly depends on budget allocation, nature, and size of the organisation. Due to the rigidness of cloud-based ERP systems, they could be beneficial to small or start-up businesses when they lack alignment of their processes. Software as a service (SAAS) will assist in aligning business processes and resources for maximum gain (Birthare & Sharma, 2020: 916).

Cloud-based ERP solutions have some benefits over on-site servers but in contrast, according to Fisher (2018:2001), there are also a few different advantages of on-site servers compared to cloud-based. These advantages are:

- Over the long term, on-site servers are less expensive due to vendor fees for hosting transactions or storage of cloud-based servers.
- Some cloud vendors have not refined their cloud capabilities and mature on-site solutions with lengthy track records could encounter difficulty transitioning to cloud offerings.
- On-site servers are less vulnerable to price increases, leakage of data or external security threats (assuming internal security is mature).
- Having better skills acquisition among employees which can become part of the culture and skills.

Furthermore, according to Sancar Gozukara *et al.* (2022:4-10), there are numerous obstacles to solutions for on-premises ERP systems. These obstacles and solutions are shown below in table 2.2.

**Table 2. 2: Obstacles and solutions of on-premises ERP systems**

| Obstacles: | Solutions: |
|---|---|
| Requires large upfront investments and requires system maintenance, software updates and configuration. | Initial investment costs cannot be avoided but can be reduced in the long term by involving staff in the implementation phase to gain knowledge to do the maintenance themselves. |
| Conflict of interest between the customer and ERP vendor. The customer expects an ERP system to fit organisational processes and ERP vendors expect the customer to adjust organisational processes to fit generic ERP systems. Misalignment of business processes and generic ERP systems could cause customization of business processes and result in additional costs. | Where generic ERP systems and organisational processes do not align, ERP vendors should consider providing ERP extensions or modifying the source codes to offer a specific solution. Customizing an ERP system has other challenges. Thus, if changing the business process is not too costly it should consider changing the business process. |
| Being dependent on ERP vendors and consultants. An ERP system will require new IT organisational skills and user support. | Vendors of ERP systems must transfer their knowledge to the users and the organisation must provide as much internal staff for knowledge transfer as required by the ERP vendor. |
| It is difficult to measure the ROI of ERP implementation and does not increase income in the short term but provides benefits in the long term. | An ERP system should fully operate before having the benefits. It will be required to do a comparison between a non-adopter and an adopter organisation to determine whether the benefits will outweigh the costs involved. |
| On-premises ERP systems have a long implementation time which delays the time to market and is affecting ROI and organisational performance. | Long implementation time could be solved by choosing an accelerated implementation approach instead of the traditional approach. |

| | |
|---|---|
| ERP systems are complex and require a large investment in hardware, software, implementation and training. | The complexity of the system can be overcome by involving senior managers throughout the implementation phase and will also affect the success of the project. |
| Decentralized decision-making will cause a loss of control over the ERP project team and will fail. | Top management of the organisation should also be included in the implementation of an ERP system and should form a proper steering committee. |

**Source: Gozukara *et al.* (2022:4-10)**

Having taken a closer look at on-site and cloud ERP systems there is also the solution of a hybrid ERP system. A hybrid cloud-based ERP system is providing the best of both worlds. The hybrid option gives an organisation the ability to choose to keep its critical applications on-premises and to migrate other modules of the ERP system to the cloud. This will provide an organisation with better flexibility and support business operations. The hybrid ERP option will allow an organisation to take advantage of the cloud-based ERP benefits while still minimizing the risks of storing sensitive corporate data in the cloud (Saa *et al.*, 2017:7).

As set out above the different ways in which an ERP system can be implemented will still be extremely important to ensure the right decision is made from the beginning and that the aim should be to build a long-term relationship with the vendor instead of focussing on the freedom to switch systems. It has been noticed that the benefit of having the freedom to switch between ERP systems is not that desirable as the indirect costs of switching are high (Seethamraju, 2015:485). After considering the different deployment alternatives; there are also different choices in terms of make, buy or rent.

## 2.5. MAKE, BUY OR RENT OPTIONS

SMEs running on a very thin bottom line should consider different options to reduce costs and increase operational efficiencies. Nearly 50% of SMEs cease to exist in the first three years mainly due to a lack of long-term strategic planning and only focus on survival. When an SME is considering ERP implementation, they should also consider the different choices in terms of build, buy, or rent options of an ERP system (Ganapathy, 2018:43).

In the case where a company has a strong IT team and sufficient resources to build its own ERP system it is recommended and could focus on best practices instead of just automation. In most cases, the build option is in the case of a large organisation and is not recommended for an SME. The buy option calls for purchasing hardware, installing new infrastructure, and obtaining the associated software which could be costly. There are several vendors for the buy option such as Microsoft, SAP and Oracle which has customised off-the-shelf ERP systems for purchasing and implementing on-premises. The last option is the rent option which allows an organisation to rent the system and pay per use. This option is a cloud-based ERP system and has the benefit of the service provider taking care of the maintenance of the system. Some vendors that have the rent option available are Oracle, SAP, and Ramco (Ganapathy, 2018:43). With all the various deployment alternatives and various choices in ERP implementation, there is also the option of considering open-source software which will reduce the costs with ERP systems.

## 2.6. OPEN-SOURCE ERP

Open-source software allows for cost reductions through the elimination of expensive proprietary licence fees, where the cost of implementing an Open-source ERP system is between 16.6% and 33.33% of proprietary ERP systems. Although open-source software has much lower costs than proprietary software, it does have shortcomings

in support and the extensive functionality that is available in proprietary systems (Stewart, 2019:7). Open-source software is developed through the Internet by professionals not receiving any compensation for their work (Joia & dos Santos Vinhais, 2017).

According to Fougatsaro (2009:25-26), there are numerous advantages of open-source ERP systems. These are flexibility, quality, the ability to adapt to the business environment, obtaining lower integration costs, having no hidden costs, having the possibility of developing the system, independence, and the freedom to upgrade when you want. Also, according to Olson *et al.* (2018:31), Open-source software can save an organisation money by enabling the use of commodity hardware, avoiding expensive maintenance contracts, obtaining better reliability, functionality and performance, having a faster learning curve, avoiding lock-in and reducing the need for specialised security consultants. When having all the different options of ERP systems, the advantages and disadvantages can be taken into consideration.

## 2.7. ADVANTAGES AND DISADVANTAGES OF ERP SYSTEMS

For SMEs to decide whether they are going to adopt an ERP system, it will be important to take all the advantages and disadvantages of ERP implementation into consideration. According to Šimović *et al.* (2020:43-44), the advantages and disadvantages of ERP implementation are set out in table 2.3.

**Table 2. 3: Advantages and disadvantages of ERP implementation**

| Advantages: | Disadvantages: |
|---|---|
| | |
| The data model is well designed. | Expectations of ERP adoption are high. |
| All the data is in a single database. | ERP implementation may fail. |
| Overall costs are being reduced. | Has a high initial investment. |
| One software for the entire organisation. | Training to use an ERP system can become expensive. |

| | |
|---|---|
| Bringing a new culture forth. | Involvement of management and special efforts of the organisation is required. |
| Information for management is easily available. | ERP systems are expensive for some organisations especially SMEs operating at the break-even point. |
| Data is much more accurate. | Specialized experts are required to do ERP implementation. |
| Success indicators for the company are monitored. | The existing way of working must change which includes a change in the organisational strategy. |
| No downtime for information with a shortened product life cycle through continuous improvement. | ERP systems are complex and difficult to understand. |
| Improved production flexibility and better logistics. | Some organisations only implement one module, thus losing the advantages of a full ERP system. |
| All parts of the organisation are connected and improved supply chain. | |
| Connecting the IS with suppliers and customers. | |

**Source: Šimović *et al.* (2020:43-44)**

With all the advantages and disadvantages of an ERP system, it could be seen from most of the disadvantages that they arise when not enough knowledge has been obtained about ERP systems and that the organisation was most probably not ready for ERP adoption. An ERP system will pay off if it provides all the stated advantages above while strengthening existing business systems and ultimately giving better business results (Šimović *et al.*, 2020:53). The numerous advantages and disadvantages of ERP systems in SMEs, also have an importance in the economy.

## 2.8. IMPORTANCE OF ERP AND SMEs

SMEs in the economy is playing a vital role in many countries in the world. They have substantial contributions toward employment and the national economy. As SMEs grow, they find the need for ERP technology to improve productivity and efficiency in operations. Due to this need customizations of ERP systems have been developed to meet the different scales and sizes of operations in different organisations (Kiran & Reddy, 2019:268-269). As ERP systems have been undergoing customisations and are putting out the possibilities of SMEs to implement these technological systems it has many implications.

SMEs and larger organisations differ from each other in the sense that larger organisations have complex systems and require customizations from time to time. In contrast, SMEs do not require much customization to their systems as they do not require all the different modules offered by ERP systems. SMEs use fewer modules as opposed to larger organisations, their costs are lower as they only pay for what they use (Gupta *et al.*, 2017:1067). This will also enable an SME to start implementation with an ERP system with only the required modules and then add more modules as the company grows. In the instance where the costs of proprietary ERP systems are just more than an SME can afford, they could consider the possibilities of open-source ERP tools. Given, all the options of ERP systems and implementations, there should not be any reason for an SME to consider an ERP system implementation.

## 2.9. FORCES AND BARRIERS TO ERP IMPLEMENTATION

For companies to decide to implement an ERP system, there should be a motivation or reason why implementation is considered. In contrast, the main reason for SMEs not to make use of an ERP system is the cost factor as they struggle to obtain the financial resources required. SMEs also do not have the necessary collateral to obtain financial help from financial institutions (Hasheela-Mufeti & Smolander, 2017:7). In

some cases, SMEs implement an ERP system due to peer pressure without knowing what they want out of the system (Jituri *et al.*, 2018:79). Some companies still have a legacy information system (LIS) which is an information system based on outdated technologies but is still critical to the organisation and has made significant contributions in the past (Tsai *et al.*, 2022:1). ERP systems are an option for a company to replace a LIS although it does not always completely replace the current LIS (Tsai *et al.*, 2022:2-3).

There are many different barriers to ERP implementation but according to Lopez (2018:165-169), there are three main knowledge integration barriers. First, are structural barriers, it is important to know the organisational structure and structural deficiencies before ERP implementation. Thus, to prevent knowledge integration problems the existing organisational structure must be known. ERP systems are extremely disruptive and cause the organisation to adopt new business processes. Because of this, some organisations fail to plan for the changes an ERP system brings forth. Second, technological barriers, within an organisation their information system people are not comfortable with supporting the users because they have not internalised the routines to support the new ERP system and they are stuck in their old procedures and applications. When new systems do not meet the full requirements of the users, they will quickly become a LIS. Thus, for an ERP system to be successful, it must overcome the complexity arising from the business and LIS. Third, intellectual and socio-emotional, knowledge transfer between the new system and the old LIS and the knowledge transfer between the consultants and ERP users. Organisational knowledge is embedded in the old LIS and individual users. This knowledge should be shared to ensure successful knowledge integration. Consultants should know that ERP users primarily consist of business knowledge and no technical knowledge. Thus, the knowledge of the consultant should be embedded and integrated into the knowledge of the users. When users and consultants have a shared understanding, this barrier could be removed.

Organisations have various drivers to implement an ERP system but, there are three main drivers for organisations to consider ERP implementation:

- The creation of a common database throughout the organisation.
- To be able to automate as much as possible of the organisation's different business processes.
- Being able to process data in different departments and be able to have organisational information available in real-time (AboAbdo *et al.,* 2019:464).

For SMEs there are various forces and barriers to ERP implementation and SMEs should identify these to make a logical decision. There are various risks involved in ERP implementation and should be considered before implementing.

## 2.10. ERP RISK AND PROJECT MANAGEMENT

Risk management of ERP implementation within an SME is important and there are some parameters to take into consideration. The three parameters that have been identified by Kiran and Reddy (2019:272-273) are: completing the project within budget, completing the project in a specified time and realising business benefits. The first parameter, completing the project within budget has shown that 51% of SMEs go over their budget when implementing an ERP system. This is making it a core aspect that must be planned carefully to avoid putting pressure on the implementation team. The second parameter, completing the project in the specified time, when the project is not finished within a specified time it will cause financial issues and delay performance, returns and break-even time. Their study shows that 35% of organisations go over their time budget. The third parameter, realising business benefits, a business needs to ensure they use the benefits created by an ERP system to have optimal returns. It shows that 62% of organisations do not realise the benefits which is making this parameter very important to take into consideration. When special attention to these three parameters has been given, the risk of failure should reduce dramatically. Although these parameters exist, there are other areas of risk SMEs should take into consideration when considering the adoption of an ERP system.

ERP systems are being carried out systematically to reduce the risk of failure. ERP implementation has critical issues associated with success factors as well as failure factors and these must be taken into consideration to make informed decisions. The present integrated e-Business marketplaces are emphasizing the need for customer-centric approaches to obtain a competitive advantage (Kiran & Reddy, 2019:269). Due to automation, integration and new sales and marketing technologies SMEs are tempted to go for ERP systems. Thus, considering the success factors, the risk of ERP implementation will be reduced.

## 2.11. SUCCESS FACTORS OF ERP IMPLEMENTATION

When an SME is launching an ERP implementation, there are a few success factors and according to Kiran and Reddy (2019:274-276), these factors are as listed below.

Success factors:

- Organisational factor. Change management is of utmost importance as in most organisations their cultures are diversified, and the implementation will touch on all levels of the organisation. When the organisational commitment is there, it will have a positive influence. Employee resistance must be avoided by educating them about their benefits and providing them with communication, training and getting them involved.
- Top management support. ERP implementation requires top-level management support throughout the process. Senior management must be involved and take the necessary steps proactively to avoid any issues.
- Business process reengineering (BPR). With minimum customization, a variety of different ERP modules are available. Business processes must be able to be aligned with the ERP modules to exploit the benefits. Minimum ERP customization is recommended as large, customized ERP systems will have a larger risk of failure.
- Communication. Effective communication between all stakeholders to disclose the progress is important. The implementation strategy and the timeline must be explicit, and the budget must be flexible without assumptions and speculations.

- ERP selection. The selection process of an ERP system is crucial and one must ensure to choose the ERP system that is aligning well with the business processes. Internal and external expert consultants must be selected, and the relationship must be maintained.

Furthermore, according to Kurnia *et al.* (2019:1202-1203), there are critical success factors (CSF) related to ERP implementation in SMEs. These CSFs are:

- Training & education. Employees of the SME should be well-trained and educated for the effective use of the system and to reduce resistance to change.
- A balanced team. Although it is more difficult for an SME to create a balanced team due to fewer human resources, it is still important. A balanced team should consist of personnel from various business departments and external consultants with relevant knowledge.
- Consultant support and vendor support. Due to the lack of human resources, SMEs will seek external experience and expertise required for successful ERP implementation. Thus, it is crucial to obtain consultant and vendor support that are willing to collaborate and assist throughout the process.

The above-mentioned are the most common success factors that must enjoy attention with ERP implementation. It is made increasingly aware that it is important for management and or owners to prepare the organisation for the upcoming change. Having the success factors, they are also accompanied by the ERP developments with regards to how ERP vendors have changed to accommodate SMEs.

## 2.12. ERP DEVELOPMENTS

Companies worldwide have adopted ERP systems to improve performance. Where the large enterprise market is close to saturation point, proprietary vendors such as SAP and Baan have begun to focus on SMEs. Even though proprietary vendors have

created more simplified and cheaper solutions to suit SMEs, ERP implementation remains a challenge for many organisations. It is argued that the findings of research based on large organisations do not apply to SMEs due to a fundamental difference in their environments (Zach *et al.*, 2014:309-310). ERP systems which are integrating multiple organisational functions are being shared between the different departments in a unified manner. Complex analytical and multidimensional powers of ERP systems enable real-time managerial and accounting information, reducing confusion between managers and enabling decision-making on current information (Goumas *et al.*, 2018: 1233-1234).

It is also found that representatives of proprietary vendors demonstrate ERP systems functionality on their own systems. It is important to only make use of vendors that would demonstrate their systems on the client company's datasets to ensure the functionality of the system does meet the company's needs (Hasheela-Mufeti & Smolander, 2017:14).

ERP implementation should be carried out systematically to reduce the risks associated with failures. In SMEs the risk element is low and the resource employment can be done by a relatively large number of the workforce (Kiran & Reddy, 2019:268). Risk management is one of the crucial parts of ERP implementation and mismanagement or risks could be the reason for failure (Sadat Safavi *et al.*, 2013:71). In contrast to risk management, an organisation should consider the external and internal issues which South Africa will have on ERP implementation.

## 2.13. EXTERNAL AND INTERNAL ISSUES IN SOUTH AFRICA

SMEs in Southern Africa are dealing with some external as well as internal issues while implementing an ERP system and must be taken into consideration while planning to implement, these are listed in the table below (Hasheela-Mufeti & Smolander, 2017:14-15).

**Table 2. 4: Internal and External ERP implementation issues in South Africa**

| External Issues: | Internal Issues: |
|---|---|
| The most common are power outages, unfortunately, this problem will be with companies for quite a while although there are ways around it, it could be expensive. | There are misfits between the ERP systems and the business processes. One of the reasons is that these ERP systems are international ERP systems. |
| Unstable Internet connectivity is an issue, and one cannot rely on one connection but should rather have a main connection with a backup connection from a different service provider. | Operational and implementation costs are deemed to be expensive and not user friendly |
| Then a lack of expertise normally leads to the implementation of the ERP system being outsourced. | A lack of management knowledge to choose the correct system and manage their team with the change. |

**Source: Hasheela-Mufeti & Smolander** (2017:14-15)

A driver for an ERP system to become expensive for SMEs after implementation is the operational and maintenance costs of the system. In most cases, these are outsourced to third-party companies due to a lack of internal staff available to do the maintenance of the system. It is recommended that internal IT staff be set up and dedicated to maintaining the system. Thus, with on-site support, the high costs of external third-party companies will be reduced (Hasheela-Mufeti & Smolander, 2017:14). Due to the high costs of ERP implementation, it will be important to have a firm grip on the change such a system will bring about an organisation.

## 2.14. PERSPECTIVE OF CHANGE IN ERP IMPLEMENTATION

SMEs follow larger organisations to stay competitive and leverage IT systems but, in many cases, SMEs fail to have a grasp understanding of the real benefits of ERP implementation. Often SMEs have a lack of resources and expertise in implementing

such a system. It is important to take note that with ERP implementation especially in SMEs the organisation will change. ERP implementation is not only of technical importance but must align with the social system of the organisation (Nair & Chellasamy, 2020:30). It is more difficult for SMEs than with larger organisations as they already understand IT and ERP systems and SMEs still learn. Therefore, SMEs need to build their readiness on the firm level. According to Nair and Chellasamy (2020:30), the owners of SMEs must prepare themselves and then must prepare the organisation for the change an ERP system will cause. In contrast, the owners of SMEs should determine the benefits such a system will bring as well as the change that will take place to the organisation.

Determining the readiness of a business to implement an ERP system is important to measure the risks to avoid potential challenges at a later stage. A readiness assessment should be done before implementation not only to determine the capability of implementation but also to identify potential weaknesses to arise. According to Yosoenarto *et al.* (2018:2), the readiness assessment can be divided into four different stages namely:

1. To identify the determinants of implementation readiness.
2. Build assessment tools on the determinants.
3. Identify the importance of each determinant.
4. Build an assessment scheme for each of the determinant's readiness.

It is important to correctly identify the determinants, to avoid a vague assessment. This assessment will also contribute to identifying the challenges implementation can bring.

## 2.15. RESISTANCE TO CHANGE

Resistance to change is extremely important to manage throughout the implementation of an ERP system. For an organisation to have a successful ERP implementation it

should be managed as a program of wide-ranging organisational change initiatives instead of a software installation effort (Savelkouls *et al.*, 2017:2).

There are numerous reasons for resistance to change but according to Gunjal (2019:158-159) some of these reasons are:

- The reason for the change is unclear.
- Fear of the unknown.
- Low trust.
- Poor communication.
- Do not understand the benefits.
- People feeling a lack of competence.

One of the key factors that are relating to failure or hurdles in ERP implementation is user resistance. Therefore, it is important to understand why users have resistance towards change so that implementation strategies can be planned accordingly and keep open communication during implementation (Haddara & Moen, 2017:861). According to Savelkouls *et al.* (2017:14), the ability of an organisation to successfully manage change is to unfreeze the equilibrium between the forces opposing and favouring change before the change can be successful. Unfreezing involves the process of preparing the organisation in such a manner that people accept that the change is necessary.

Resistance to change caused by ERP implementation is important to have a strategy in place to overcome this problem. Some methods have been identified to overcome resistance to change and increase the use of the system in the post-implementation phase. User engagement is an effective way of garnering the assistance and interests of users. Participation of the users enables interaction with the system designers throughout the system development process. Getting users to participate in ERP implementation will provide a better fit of the user requirements, improve the system quality and user acceptance. Knowledge integration is another important aspect of ERP implementation and consists of the know-how and explicit knowledge of the

individuals integrated into the organisation. Another method to overcome resistance to change is to have open communication to avoid uncertainty. Effective communication from superiors to subordinates is an effective way to decrease resistance to change. Lastly, leadership is also important in managing change. Transactional and transformational leadership are important in leading change. Transactional leadership consider creating minor improvements and maintaining performance quality. Transactional leadership may be more important throughout the implementation. Transformational leadership is important to shape employee perception and evaluation of management change communications. It will be important for leaders to balance both types of leadership (Savelkouls *et al.*, 2017:20-21).

In highlighting, some of the CSFs associated with change management it will assist in managing the change that an ERP system will bring to the SME. The most widely recognised CSF is training and education due to the lack of knowledge of the system users, they will resist the change, as they are uncertain of what the change will bring. Thus, training for the users of the system is extremely important to overcome resistance and exploit the full functionality of the system to have a realization of the benefits (Haaland & Olsen, 2020: 11). Some system users fear ERP implementation as they think it will either make their work harder, or affect their importance in the company, or affect their status. These can be overcome by developing change management strategies that can involve creating a vision, having good communication and having incentives (Haaland & Olsen, 2020:9).

Furthermore, according to Savelkouls *et al.* (2017:30), most people often don't like change. Thus, the readiness of an organisation is determined by whether the employees support or resist the change. An organisation will be ready for change an ERP system will bring forth when employees have a positive view about the need for change and when they believe the change will have positive implications for themselves as well as for the organisation. When employees are ready and positive about the change then resistance to change will be less likely.

## 2.16. CONCLUSION

Many reasons for ERP implementation for SMEs have been highlighted in the literature review specifically to reduce costs and improve operational efficiency within the organisation. Open-source and cloud ERP solutions are looking attractive for SMEs. Open-source purely because the software is free and cloud due to low initial investment costs. In this literature study, various ERP options are available, and an SME should make sure to make use of the correct option. Although some options such as the cloud-based are initially less expensive, on-premises ERP systems show lower costs over the long term, better security and better operational improvements.

The literature has indicated an enormous amount of benefits an organisation can receive by optimally making use of an ERP system which is making ERP adoption even more attractive. It has also been indicated through all the success factors that there are numerous aspects to take into consideration for ERP adoption to be successful. Also, many disadvantages have been mentioned in the literature which is making ERP adoption less attractive.

Within SMEs, the risks of failure have been highlighted and the consequences of failure could financially mean the downfall of the organisation. Change management has been pointed out many times in the literature and an SME should be ready for the change such a system will bring to the organisation. Also, the management of the organisation must participate throughout the process to manage the process and lead ERP users through the change process.

Although change management have been mentioned numerous times. A SMEs readiness does not only depend on the organisation's readiness for change but also financially. If the organisation does not have the resources and capability to implement it will also fail. Thus, from the literature, an SME will be ready when it will be able to handle the change, have enough resources and will be able to adhere to the CSFs.

For an SME to consider ERP implementation the organisation should be able to reap the benefits of integration and improve operational efficiency.

## 2.17. CHAPTER SUMMARY

In chapter two the focus was on determining the readiness for an SME to implement an ERP system by studying the literature on ERP systems, open-source software, and organisational readiness. The literature has included what an ERP system is and all the different development alternatives as well as the different options for ERP implementation. Furthermore, the literature includes the benefits, advantages, disadvantages, and risks for an SME to implement an ERP system. Along with the relationship being indicated between an SME and an ERP system and how an ERP system will affect an organisation through the implementation process.

It is much clearer for an SME to have an idea of whether their organisation is ready for ERP adoption through the literature of this chapter. Although there are benefits, advantages, disadvantages, and risks with ERP adoption. An SME should assess their readiness for the change such a system will bring to the organisation and if the resources are available then the other factors must be taken into consideration before implementation.

# CHAPTER 3: EMPIRICAL STUDY

## 3.1. INTRODUCTION

In Chapter two a broad literature study was performed to explore the readiness factors for SMEs to implement an ERP system. Through the literature many different factors arise which will influence the readiness for an organisation to consider ERP implementation. These factors include the following:

- The broad definition of an ERP system.
- The deployment alternatives as well as the costs of ERP systems.
- Different make, buy or rent options and Open-source ERP systems.
- Importance of ERP in SMEs with their advantages and disadvantages.
- Forces and barriers to ERP implementation.
- Risks of ERP adoption.
- Success factors of ERP implementation.
- Perspective of change in ERP implementation and resistance to change.

All the above factors have an influence on a SMEs readiness to implement an ERP system. These factors also all must be taken into consideration before implementation is planned.

Chapter three explains how the study's research was conducted. Insight into the study's research approach is provided in Chapter three. The chapter goes into greater detail on the research strategy and methodology, giving specific justifications for why qualitative research was selected for this study. The procedure of conducting research and analysing the data are covered in the following section of the chapter. After the analysis and interpretation of the data gathered during the study, the chapter next concentrates on the outcomes as well as the results.

## 3.2. RESEARCH STRATEGY

Research strategy can be defined as the process of collecting and interpreting data with clear objectives which is a plan set out by the researcher to answer the research question or to achieve the research objectives (Rahi, 2017:2). Interviews are mostly associated with qualitative research. Structured survey interviews are of a tightly structured format and questions are asked in a specific order by using the same format. Semi-structured interviews are less tightly constructed where the interviews are loosely formatted with follow-up questions relative to what the interviewees have already said, thus they are unstructured. Both structured and semi-structured interviews have open-ended questions so the interviewee will be able to expand on their answers (Roulston & Choi, 2018:233 - 234).

In this study, open-ended semi-structured interviews were used to gather the primary data for this study. This interview strategy was chosen to gather the richest information.

## 3.3. METHODOLOGICAL CHOICE

A researcher must determine whether the research is going to be of a quantitative or qualitative nature. A qualitative research approach is providing insight and understanding of the problem setting and is used to research highly complex phenomena. Qualitative research is more subjective with an inductive process and is associated with the interpretivist research paradigm (Ahmad *et al.*, 2019: 2-5). A quantitative research approach is relying on methods of natural science that is producing numerical data and hard facts to determine the relationships between two variables. Quantitative research is more objective with a deductive process and is associated with a positivistic research paradigm (Ahmad *et al.*, 2019:2-5).

The research approach chosen this study was qualitative by researching many different SMEs and exploring the research subjects, experiences, behaviour, and phenomenon to better understand them. Because this research is exploratory and its results cannot be quantified, it was decided to use qualitative research instead. The

decision for qualitative research was supported by the need to have a detailed understanding of the issue.

## 3.4. RESEARCH PARADIGM

A research paradigm is referred to as the philosophical or theoretical ground for research where the paradigm is revering to the philosophical way of thinking which is influencing the methods that researchers use to conduct research (Khatri, 2020: 1435). According to Alharahsheh and Pius (2020:41), a paradigm includes several components such as Ontology, Epistemology, Methods and Methodology. There are two main paradigms namely positivist and interpretivist. The positivist paradigm is based on the philosophical stance of a natural scientist that is working with observable reality within society and is considering pure data and facts without being influenced by interpretation. Interpretivist paradigms are concerned with the in-depth variable and factors related to context and are considering different physical phenomena of humans. For this study, qualitative data was analysed and tested through interpretivist philosophies. The data collection instrument was an interview. It was completed by SMEs that have already implemented an ERP system or is busy implementing or are considering implementing such a system. This determined the possibilities of open-source software and the readiness to implement an ERP system in SMEs. In doing so the challenges, opportunities and advantages were determined.

## 3.5. RESEARCH APPROACH

According to Woiceshyn and Daellenbach (2018:5), the methodological approach is the referring to how the researcher intends to carry out their research. This approach can be deductive or inductive. Inductive is making empirical observations about phenomena that is forming concepts and theories. The deductive method derives the hypothesis from the theory of previous researchers, testing those hypotheses and then revising the theory. The deductive research approach is relating more to the positivist philosophy and the inductive to interpretivist philosophy (Al-Ababneh, 2020:85).

In this study, an inductive method was used in this qualitative research approach based on to collect data and developing a theory to reach a finding on the data analysed. This approach was used to make hypotheses which were based on data and to test these theories further.

## 3.6. TIME HORIZON

The time horizon of research is defining the time frame in which the research will be conducted which is either longitudinal or cross-sectional. Cross-sectional study data is collected from the entire population or subset thereof and these data will assist in answering the research questions. Data is collected between two different variables at one point in time (Kesmodel, 2018:388-389). Cross-sectional designs are used by empirical researchers to describe the population of interest at one specific point in time (Wang & Cheng, 2020:65). A longitudinal design is done over a long period and makes multiple observations over some time. The longitudinal study usually involves a smaller study population but is observed multiple times (Bell, 2021:72-73). For this study, a cross-sectional research design was followed as the study was done at one point in time in the short term. Due to studying the different challenges and opportunities of implementing an ERP system so doing determining the readiness at one point in time and determining the possibilities of open-source software.

## 3.7. POPULATION

### 3.7.1. Study population

This study by determining the possibilities of open-source software and readiness of implementing an ERP system in an SME concluded the study population of all manufacturing SMEs that have already successfully implemented an ERP system or is busy implementing or are considering implementing. The National Small Business Act, of South Africa of 1996, as amended in 2019, describes a Small Enterprise as a distinct business entity with all branches or subsidiaries which is managed by one or

more owners in any sector of the economy (Department of Small Business Development, 2019:110). The criteria under which SMMEs fall are shown below in table 1.1.

**Table 1. 1: Criteria of SMME**

| Industrial classification | Size of enterprise | Full-time employees | Annual turnover |
|---|---|---|---|
| Manufacturing | Medium | 51 – 250 | <= 170 million |
| Manufacturing | Small | 11 – 50 | <= 50 million |
| Manufacturing | Micro | 0 – 10 | <= 10 million |

**Source: Adapted from; Department of Small Business Development, (2019:111)**

All manufacturing SMEs that fall into the criteria above formed part of the study population, where the study population is revering to one per SME. In the third quarter of 2020, there was 3 506 manufacturing SMMEs in the North-West province (SEDA, 2021:24). Data about the number of these SMEs which is ready to implement or have implemented an ERP system was unavailable. The interviews were held with the management or head of IT of the organisations as they consisted of the knowledge required.

The target audience of this research concluded the researcher as well as all businesses that is requiring the information within this field of study such as companies considering the implementation of an ERP system.

### 3.7.2. Criteria of the participants

According to Patino and Ferreira (2018:84), the key features of inclusion criteria are those of the population that the researchers will use to answer the research questions and exclusion criteria are inclusion criteria but have features or characteristics that could unfavourably influence the success of the study. For this study, these were the following criteria.

Inclusion criteria:

- The business should be older than 5 years.
- Should have no more than 250 full-time employees.
- Only businesses in the Northwest province.
- Must be a manufacturing business.
- Should have implemented or is busy to implement or is considering implementing an ERP system.

Exclusion criteria:

- Less than 10 full-time employees and more than 200 full-time employees.
- Providing inaccurate data.
- Manufacturing SMEs competing with the researcher's organisation.

### 3.7.3. Interview strategy

Sampling is the process of selecting a portion of the population that would represent the whole population in the area of research and the sampling strategy is the strategy to be followed to ensure that the sample taken from the population would represent the entire population (Landreneau & Creek, 2009:1-2).

Sampling strategies are divided into two different sample designs namely probability sampling and non-probability sampling. Probability sampling is giving greater confidence in the data collected due to the participants of the population having equal chances of participating through random selections and non-probability sampling is not random and does not give equal chances of participation (Nwaogazie *et al.*, 2019:1115). Convenience sampling is a process of data collection that is referring to the sample that is easily accessible for the researcher and is more cost effective to reach the intended sample although this method could easily be criticized (Rahi, 2017:3). In this study, a convenient, non-probability interview strategy was followed due to accessibility of participants, lower costs, and enabling the researcher to identify

businesses that was best suited for this study within the target population. This strategy also enabled businesses to participate willingly with the most trusted data.

Included in the interviewing process was to comply with the POPI Act (Protection of personal information act). The purpose of the POPI Act will be to conduct research responsibly when collecting, storing, processing and transmitting personally identifiable information to eliminate the abuse of personal information (Kandeh *et al.*, 2018:3). PAIA has been created to comply with section 32(2) which states that everyone has the right to access any information held by the state or any other person but should not create a financial burden on the information holder (van Wyk, 2019:25). In all the processes of collecting and analysing data in this study, all the information was protected as well as permission was received before gathering the data from participants. Following the PAIA, information was available for participants to later recall their information until the date of destruction.

### 3.7.4. Demographics of the study population

For this study, SMEs in the Northwest province were the population and only in the SME manufacturing sector. Thus, due to this restriction, convenience sampling was used. SMEs which did not fall within the study criteria was excluded and did not participate in the interviews.

### 3.7.5. Accessibility of study population

The study population was referred to as manufacturing SMEs in the North-West and it was necessary to have the business owner or head of IT participating in the interviews. Considering the owner or head of IT is aware of the struggle, preparations, and financial implications that implementation of an ERP system is bringing forward. Thus, considering that only a few companies will be forming part of the study population, the

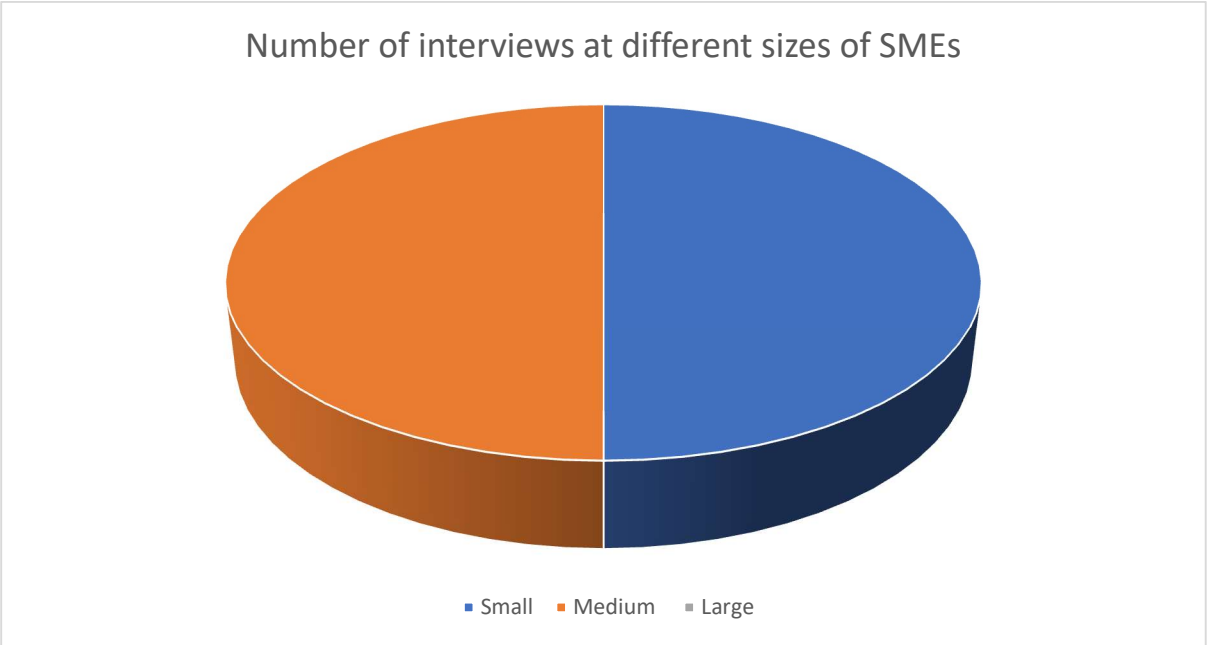
participation rate was high. Utilizing a proper approach toward these companies in the study population, sufficient interviews were obtained.

Due to the North-West being quite large which affected the distance to travel and time it consumes it was necessary to gain provisional access to the population. Thus, employing an online quick presentation and setting up a convenient time for the business owner or management ensured willing participation and that the information being gathered was as accurate as possible. Furthermore, finding manufacturing SMEs in the population that falls into the criteria was another task and was done through recommendations. In the case of insufficient participation, it was possible to consider close related industries to compare.

### 3.7.6. Interview size

Considering the accessibility, time, and cost constraints the number of interviews was quite small but for this study, a small number was sufficient due to the nature of the study. In this study, an interview approach was more suitable due to the population of 3 506 manufacturing SMEs in the North-West, South Africa. Thus, a qualitative interview approach was used due to the lack of participants for a quantitative approach. The number of interviews was estimated at six to ten interviews as the saturation and richness should be achieved, otherwise answers will repeat. For this study eight organisations participated of which according to their number of full-time employees, four are small and four are medium. Figure 3.1 below is a visual representation of the sizes of the organisations that participated in the interviews.

**Figure 3. 1: Number of interviews at different sizes of SMEs**




The owner, manager or head of the company's IT were contacted to schedule the interviews. The interview questions for this study are attached as **appendix A**.

With homogeneous convenience sampling, the researcher studied a sample from the population that had homogeneous factors in common (Jager *et al.*, 2017:21). Based on the study population manufacturing SMEs that has implemented an ERP system is causing the interviews to be more of a homogeneous nature as the businesses have many similarities such as the reasons for implementation.

### 3.7.7. Relationship between researchers and participants

The research is based on businesses outside of the researcher's organisation making the conflict of interest minimal to non-existent between the researcher and the participants. The only similarities were that the researcher and participating businesses were both in the manufacturing SME sector. Thus, the only conflict of interest could have been businesses manufacturing the same products which made direct competition. To eliminate this issue businesses which were in direct competition was

excluded from the study population although businesses in the same industry selling to different markets was still included.

## 3.8. DESIGNING THE MEASURING INSTRUMENT

An interview is a data collection instrument mostly used in qualitative research with a set of related questions on a certain topic for the participant to answer which is of value to collect the most important ideas and themes and to reach a hypothesis (Weller *et al.*, 2018:2). For this study, the data collection instrument used was an interview that were drawn from existing interviews in the same field of study. Although the interview was adjusted according to best suit the data required for this study. Using existing interviews was advantageous as they have already been used and tested and are known for their properties of reliability and validity. As mentioned before the interview was semi-structured with open-ended questions. The interview consisted of two sections where the first section was to gather the necessary demographic information and the second section to gather the relevant decision-making data. For an interview to be successful it should indicate the purpose of the research, the questions should be arranged logically, be easy to understand and answer, and must cover all the information required by the researcher (DeJonckheere & Vaughn, 2019:3-4). The purpose of the interview was to determine the advantages or benefits and disadvantages or pitfalls of implementing an ERP system as well as to determine the possibilities of open-source software and the readiness for an SME to implement such a system.

## 3.9. COLLECTION OF DATA AND RECRUITMENT OF PARTICIPANTS

### 3.9.1. Nature of recruitment

Supporting the number of interviews that was done it was be crucial that the data gathered from the participants must be accurate and true. Thus, the researcher contacted the participants himself to ensure willing participation. Unwilling participation in the research interviews would have led to incorrect data. Communication with the

participants constituted a summary of the researcher and the purpose of the study. Most importantly the participants had a clear idea of why this research was conducted, that their information will be kept confidential and that their participation is voluntary. Furthermore, the summary of the interview were communicated such as the type of questions and duration of the interview. These communications was supplied before the interview began.

The role of the researcher was to personally conduct the interviews with the participants. The researcher also ensured to recruit willing participants and explain the purpose of the research and the interview. The interview were held in such a way that the answers was as honest and true as possible to gather reliable data.

### 3.9.2. Data collection process

The process that was followed for the data collection of this study firstly constituted contacting the participants through telephone or email to confirm participation in this study and to set a date and time for the interview. The interviews were scheduled during October per telephone to obtain acceptance of their participation in this research. From there the interview was held on the specified date and time. The interview was conducted by making use of technology through Zoom or a personal interview. Furthermore, where possible, the interviews was held in person at the interviewee's office. After five interviews, saturation had been reached, but the researcher still spoke with three additional subjects to make sure the interviews were valid. Before the validity of the instrument could be accepted, information from the interviews was gathered and analysed. It was simple to determine the primary and secondary objectives because of the study's numerous intriguing perceptions.

Prior to each interview, the consent form was sent to the participants and permission to record the interview was confirmed with the interviewees. From all the participants, only two interviews were conducted through the ZOOM meetings platform, the rest of

the interviews were conducted in person at the offices of the interviewee. It was very challenging to set a time with the owner or head of IT due to their busy schedules. The average interviews lasted between 15 and 25 minutes with only two that stretched over 30 minutes. During the interview notes was taken by the researcher to assist with the analysis of the data. During the interview the interviewees were open to completely answer the questions and where necessary the researcher asked additional questions to have complete answers.

## 3.10. FINDINGS FROM INTERVIEW DATA

Within the findings of this study will assist manufacturing SMEs in determining their readiness to implement an ERP system. This study is highlighting the factors which is affecting the readiness point for manufacturing SMEs to implement an ERP system. Furthermore, this study's findings will give a better understanding of the driving forces of manufacturing SMEs to implement, what the benefits are and what the challenges are.

The participating companies were in a variety of different manufacturing industries and different sizes. This variety has broadened the view and perceptions of ERP systems. In Table 3.1 below is showing the companies with their different industries and sizes.

**Table 3. 1: Participating company's years of existence, size, industry and type of software**

| Username adopted for the study | Years in existence | Company size | Type of industry | Type of software in use |
|---|---|---|---|---|
| Company 1 | 10-20 Years ago | Medium | Steel manufacturing | Simple software |

| | | | | |
|---|---|---|---|---|
| Company 2 | 10-20 Years ago | Small | Product line manufacturing | Simple software |
| Company 3 | More than 20 years ago | Medium | Chemicals | ERP software |
| Company 4 | More than 20 years ago | Medium | Product line manufacturing | ERP software |
| Company 5 | More than 20 years ago | Medium | Product line manufacturing | ERP software |
| Company 6 | More than 20 years ago | Small | Chemicals | Simple software |
| Company 7 | More than 20 years ago | Small | Product line manufacturing | Simple software |
| Company 8 | More than 20 years ago | Small | Signage manufacturing | ERP software |

As shown in table 3.1 above, the interviews were held with the company's owner or head of IT. This improves the quality of the interviews and the data collected. Also, all the participants were either small or medium in terms of their employee factor.

### 3.11. SAMPLE PRESENTATION OF SEMI-STRUCTURED INTERVIEW DATA

For the interview data to be presented will have the following references:

- Key: Q (1)1: Question (Interview Number) Count of Questions

- Key: A (1)1: Answer (Interview Number) Count of questions

The interview number will be revering to the company number. For example, when referring to interview number one it will relate to company one.

**Question 1**: How familiar are you with open-source tools and to what extent did you receive training on open-source software?

This question tries to determine the knowledge of which the participants have on open-source software. This question will assist to understand why SMEs do not make use of open-source tools.

**a) Responses from participants**

**A (3 )1**

*"I have used open source when I did my A+, so I know somewhat about open source, the company's staff however do not know open source. I have tried to get them on the most standard programs, but this is why I tend to stay away from opensource software."*

**A (4) 1**

*"Currently do not have any software of that matter and if software like that is being implemented where usually create some sort of self-study using YouTube or any other means of Cook information."*

**A (6) 1**

*"I did not receive any training on software other than Adobe which we are currently using."*

**A (8) 1**

*"No training received as it is not necessary. We do use Adobe and Java."*

From all the participants, only **A (4) 1** had formal training with his studies. Further, none had training on open-source software except for using some basic software such as Adobe reader. According to participant **A (4) 1** if open-source software is to be used it will cause self-study and more training.

**Question 2:** From your perspective, broadly specify the benefits your business would receive or is receiving from using an ERP system. If your organisation has already implemented an ERP system, does your organisation make use of all the benefits?

This question tries to determine whether the participants have knowledge of the benefits that an ERP system will bring to the company and whether they make use of all the benefits that an ERP system will bring.

**b) Responses from participants**

**A (2 )2**

*"Not relevant since it's not used, however it would make things go a lot faster. Since we are still a small business there is not a need for it currently."*

**A (3 )3**

*"This is Pastel I assume, at this moment we are already making use of pastel, within the Pastel revolution. Then as I said we do not use all of the programs; we do use some of them. The ones that are relevant to our business such as stocktaking, production, sales and modules for the financial aspects of the business. This is due to everything working together, the stock is added to it and we know how much of each product is available. How many we have in stock and how many has been sold.*

*This is all compiled together in one program."*

**A (4) 2**

*“Already started implementing sage and I would say it does have a few benefits one of them being the fact that it does on cloud drive. Remind benefits that I can think of at the moment is the safety of the hotel since it's stored on the cloud and not the device itself so if the device is stolen or broken then I can still access the information.*

*The information that I can access in any area that I am I don't have to worry about being an office so the remote work section of the software is also very helpful. the final benefit that I can name is the mobile app that is also available so if I do not have my laptop with me I can quickly access my phone to just send an invoice or other document. The benefit that I forgot to mention but that would be the bank account and transaction update where permission to my bank account would let the software system send me notifications as to which quote has been accepted or paid.”*

From participant **A (2) 2** which only have simple software, they do not have knowledge of the benefits of what an ERP system can bring. Then from participant **A (3) 3** and **A (4) 2** which are both using an ERP system has knowledge of the benefits but does not relate to all the benefits as seen in the literature review. The benefits which stand out are integration, automation, live information and accessibility.

**Question 3:** Broadly elaborate on whether you would agree if your organisation had or has the financial, technological, and human resources available to adopt an ERP system.

This question tries to determine whether the participating companies has or had the resources available to implement an ERP system.

**c) Responses from participants**

**A (1) 4**

*"Remember, a lot of our people are unschooled, so that you've, if you've got somebody in the factory that can read and write I can give you every system under the sun is not going to make any sense to you."*

**A (8) 3**

*"The program was purchased through a software supplier who did not have sufficient knowledge of the system. As a result, additional courses had to be taken which resulted in a conflict with the system due to incorrect revisions. We learned the integration and only after a fourth attempt, somebody was able to assist more appropriately."*

**A (4 )3**

*"The organisation is prepared enough for the update or to adopt it the biggest concern we had to face was more of the human factors or human resources."*

**A (2) 3**

*"I think we do have the resources if we needed to ever convert to that."*

Only participant **A (2) 3** indicated that they have the resources available but from the other participants, human resources are their biggest concern. Further, financial and technological resources do not seem to be a constraint.

**Question 4:** Please specify whether, in your business, open-source ERP tools would have or had made a reduction in operational costs, improve customer service, reduce license costs, and reduced hardware upgrade costs.

This question is taking a deeper understanding of whether the participants would agree if open-source software would decrease overall organisational costs.

**d) Responses from participants**

**A (2) 6**

*"We do not use it. Most of our systems and software are user-friendly. If one would go more complex, then employees would need training and additional cost of license would raise our cost in general."*

**A (3) 5**

*"We do not, the cost would have amounted to the same, if we had to go that route we would probably run Linux software. Open source is not always freeware so many times there is still cost to things. The training cost and reduction, I do not think there would be a reduction cost since Pastel is the standard software used."*

**A (6 )4**

*"No. At the moment we are only using Adobe and the information on open-source tools are limited making it difficult to respond as to whether it will reduce costs."*

The participants do not agree that open-source tools will have a reduction in costs. Most of the participants do not have a clear understanding of open-source software and the participants who do know indicates that open-source will have a result in additional costs such as training due to the systems being complex.

**Question 5:** Broadly elaborate on the pressure points causing your organisation to consider ERP implementation or have caused it to implement it.

This question tries to determine what pressure points there are for organisations to consider ERP implementation.

**e) Responses from participants**

**A (7) 6**

*"The process without ERP systems is much longer."*

**A (6) 5**

*"The main point would be to have improvements on the operation process as well as labour costs, which will be reduced. The automation integration will also be beneficial."*

**A (5) 6**

*"We try to stay updated with the current technology. Because of the increase in employees, it was very helpful not like in the previous years based on paper systems."*

From the interviews it is stated that the pressure points were due to the companies growing and the volume of work is reduced through an ERP system. The participating companies specifically revert to their organisations requiring automation and integration.

**Question 6:** At what point in your organisation's existence did your organisation decide to implement an ERP system? What were the total cost of implementation and the cost of the system?

This question tried to determine when the participating companies were ready to implement an ERP system and what the costs were. This question is related to the participants who have already implemented.

**f) Responses from participants**

**A (8) 6**

*"All costs amounted to almost over R1M. This includes license cost, implementation, upgrading, course and training, software, and professional year-end tasks."*

**A (4) 6**

"Happened a few years back and if I had to roughly guess I would say Approximate amount of R20 000.00 to R25 000.00."

From both participants **A (8) 6** and **A (4) 6** they were unsure of when the company implemented their ERP system. The difference in the amounts of these participants is enormous due to different types of systems being implemented.

**Question 7:** Are you currently considering an ERP system for your organisation? Which ERP system are you considering and what is the cost implication?

This question tries to determine whether the participating companies that are considering ERP implementation has a good idea of the systems they are considering and what the cost implications would be.

**g) Responses from participants**

**A (6 )6**

*"Yes. We are in the process of looking at either IQ Retail or SAGE online. Not certain about the cost however SAGE Online may be a better option as it does not require an onsite server. SAGE provides a cloud."*

The participants were very unsure of which ERP systems were available and what the cost implications would be. However, participant **A (6) 6** has already done some research on which systems to consider but is still unaware of the cost implications.

**Question 8:** Please elaborate on the enthusiasm management has or had to adopt and your employees' enthusiasm for adopting an ERP system.

This question tries to determine how enthusiastic the people within the participating companies are or were with ERP system implementation.

**h) Responses from participants**

**A (2) 10**

*"Another thing our employees are still rather old school and consists of all the people they prefer so to speak a paper-based system."*

**A (4) 8**

*"However, that was implemented a long time ago I would think that the employees at that time were quite enthusiastic about it."*

**A (5) 8**

*"However, if a person or an employee does not know how to use Pastel they will not be able to work here. Since everything is already on the Pastel system."*

This question has a very diverse response. From participant **A (2) 10** which is a company where management considers implementation, the employees are not enthusiastic as they are used to a paper-based system. Participant **A (4) 8** suggests that the employees were enthusiastic when the system was implemented. Participant **A (5) 8** does not know the employee's enthusiasm but mentions that people will not be employed unless they already know their ERP system.

**Question 9:** Broadly elaborate on whether you would agree that an ERP system will increase employee performance and motivation.

This question tries to determine whether SMEs would agree that an ERP system will increase employee performance and motivation.

**i) Responses from participants**

**A (3) 10**

*"It is for sure much better since it makes stock count a lot easier and it is a faster process to complete. Did how positive effect on production."*

**A (4) 9**

*"I personally think that it would increase the employee performance, since it is easier for them to access information and to check what might be currently going on so I would say that is definitive."*

This question had a very positive response. The participants strongly believe that an ERP system will increase employee performance due to automation and easier accessibility of information.

**Question 10:** Broadly specify with your knowledge the challenges and barriers to ERP adoption that your organisation has.

This question tries to determine the challenges and the barriers to ERP adoption. The challenges a considering SME would have and the challenges an already implemented SME has. Also, the barriers to SMEs considering ERP implementation.

**j) Responses from participants**

**A (5) 10**

*"Loading everything on the system and learning how it works".*

**A (6) 10**

*"Cost remains a challenge and barrier. As we also do not have onsite technological support, it contributes to challenges. There are not knowledgeable staff that can assist."*

**A (3) 11**

*"Most of Pastels' formulas with the same as Excel however the last couple of times we had to change and adapt so that it would be compatible with our current version of Pastel."*

The big barrier to ERP implementation is the cost of implementation and the system and the process of implementation and getting all employees trained on the new system. The main challenge is the human factor, as SMEs do not always have the human resources available to implement such a system.

**Question 11:** Do you think the company's management will successfully manage the change that an ERP system will bring?

According to the literature, change management are one of the biggest challenges. This question tries to determine whether the change such a system will bring could be difficult to manage.

**k) Responses from participants**

**A (1) 11**

*"Yes, easily. In this environment, we have sourced people that work with high volumes of work under severe pressure. In a manufacturing environment, you need to be able to adopt to adapt to change very quickly."*

**A (4) 11**

*"Implementation was very easy since everyone agreed that it would be a very good idea and most if not all of the employees had assisted in making the transition without complications."*

**A (6) 11**

*"It will certainly be a challenge as change is always difficult. Management will also have to keep to the implementation processes which may be challenging as well but I believe that it will be successful."*

From the participants responses, change management seems not to be such a big challenge and could be overcome easily, although participant **A (6) 11** does agree that change is always difficult.

**Question 12:** With your knowledge, do your customers, suppliers or competitors use an ERP system?

This question tries to determine the knowledge which SMEs have in terms of the types of ERP systems that are available.

**l) Responses from participants**

**A (5) 12**

*"Overall, I would say 80% of our customers and suppliers to make use of ERP systems, since we deal with mass production or bulk production, they use ERP systems as well.*

*We do not really have big number of competitors but I'm sure they do. We try to get along with every one of our competitors, so we help each other. I can't tell you which ERP system they are using."*

**A (6) 12**

*"Our suppliers definitely use ERP systems for example Coca-Cola. Feedback was also received from drivers who confirmed that an ERP system makes processes easier. Currently not aware of any competitors who are using it, however, some of our clients are using ERP systems."*

From the participants responses they are relatively aware of which of their customers and suppliers are using an ERP system but when it comes to their competitors, they are not sure what systems they are using.

**Question 13:** Broadly elaborate on whether you think, an ERP system has a positive contribution to your organisation and whether your think an ERP system will increase your company's competitive advantage.

This question tries to establish the perspective or the participants towards an ERP system, whether they think such a system will be beneficial toward the company.

**m) Responses from participants**

**A (5) 13**

*"I think none of our competitors do not have some sort of ERP system. I think making use of an ERP system is not something that will affect the competitive advantage since our competitors make use of it as well. I do not know of a company that does not have an ERP system."*

**A (6) 14**

*"It will have a positive contribution to an extent. In regard to competitive advantage, it may not only be an advantage as it will be a necessity due to changes required with further enhancements. It will certainly be an advantage in regard to replacement and saving on labour cost, against competitors. The sooner it is implemented, the better."*

**A (8) 13**

*"With us, it did improve."*

The participants do agree that an ERP system will have a positive contribution to the company but does not completely agree with having a competitive advantage. The general feel is that companies require an ERP system to stay competitive instead of gaining the competitive advantage.

**Question 14:** According to your knowledge, which ERP systems do you know of?

This question will establish how knowledgeable SMEs are with the different ERP systems.

**n) Responses from participants**

**A (8) 14**

*"SAGE, ACCPAC, SAP, Pastel."*

**A (2) 20**

*"I have a very basic knowledge of this so as I have mentioned I use Pastel but it is only for the most basic of tasks."*

The responses had a relationship with the SMEs who have already implemented and those who still consider. The participating companies who have already implemented has knowledge of some different ERP systems and those still considering does not know many ERP systems. As seen with participant **A (8) 14** who has already implemented and participant **A (2) 20** who is still considering implementation.

**Question 15:** Do you think your organisation is ready to implement an ERP system? If already implemented, do you think your organisation was ready?

This question tried to establish whether SMEs who have implemented an ERP system were ready for implementation and whether the SMEs still considering implementation think they are ready to implement.

**o) Responses from participants**

**A (3) 16**

*"I think we were prepared since we already have someone that understood the software and could assist with orientation to those who did not understand it completely."*

**A (8) 15**

*"Yes, as it was a necessary implementation."*

**A (5) 15**

*"We have we were ready at time since as you well know we already utilising it."*

**A (6) 16**

*"We have not yet implemented as it is still in consideration. We are however very close to implementation and are hoping to have it implemented successfully within 3 to 5 years."*

From the participants who have already implemented an ERP system believes that their organisation was ready and states that it was necessary to implement. The participating companies that are still considering implementation, most of them believe that they are ready for implementation.

## 3.12. METHOD FOR DATA ANALYSIS

Qualitative research analysis uses a systematic coding to describe and understand textual data. Identification of categories, themes, and patterns as result of data analysis (Assarroudi *et al.*, 2018: 43). Textual data from audio recordings was analysed and transcribed for this study. Attached as **Appendix C** are a sample of one of the interviews that was transcribed. To become familiar with, comprehend the depth and breadth of the data, the researcher became really engaged with it. This process involved to repeatedly go through the material and looking for patterns and meanings. Before commencing with data coding and finding categories and themes, it was crucial to read over all the data.

Iterative, nonlinear processes are typically outlined for qualitative data processing. Therefore, it is typical for researchers to not provide a step-by-step analysis process (Lester *et al.*, 2020:98). For this research a thematic analysis was performed which includes seven phases. According to Lester *et al.* (2020:98-101) these seven phases are:

1. Preparing and organising the data for analysis. In this phase all the data which will be used for analysis will be gathered, such as the interview notes and interview recordings.
2. Transcribing the data. The data collected for this qualitative study was by holding interviews with the participating companies. The recorded interviews were transcribed once the interviews were finished.
3. Becoming familiar with the data. This step is a light initial analysis of the data that were transcribed. A researcher should be aware of the constraints or gaps in the data that have been gathered, so it is beneficial to become familiar with the corpus of data.
4. Making memos of the data. This phase involves making reflective memos about what the researcher is learning from the data.

5. Coding the data. This is an important phase in this study's thematic analysis process. this involves extracting important statements, reflections and experiences in short descriptive words or phrases.
6. Generating codes into themes and categories. The use of codes, the creation of categories, and the eventual fabrication of themes are all steps in this phase. The categories will be extracted from the codes and then the theses from the categories.
7. Making the analytic process transparent. This phase involves presenting the information about the analytic process in a transparent and verifiable manner.

An inductive approach to qualitative research was used with grounded theory methods. For this study three steps were used for data coding to analyse the data, put it in order, and identify commonalities and trends among participants. These three steps are open coding, axial coding, and selective coding.

### 3.12.1. Open coding

The initial level of coding is known as open coding. The researcher is identifying distinct concepts and topics for categorisation through open coding. By establishing initial broad thematic domains for data aggregation, the first level of data is arranged (Williams & Moser, 2019: 48). This was done by going through all the transcripts and identifying key words and phrases for developing the codes.

### 3.12.2. Axial coding

The second level of coding is axial coding. Axial coding further clarifies, aligns, and categorizes the themes in contrast to open coding, which concentrates on finding emerging themes. The obtained data can be sorted, refined, and organized in order to create clear theme groups in advance for selective coding after open coding is finished and the shift to axial coding is made (Williams & Moser, 2019: 50). The codes obtained

through open coding were sorted into categories where relationships were found between the codes.

### 3.12.3. Selective coding

The third level of coding is selective coding. It allows the researcher to choose and incorporate ordered data categories from axial coding into coherent phrases that are rich in meaning. By taking steps that elaborate on or formulate the case's story, selective coding builds on axial coding at a higher degree of abstraction. The process of enabling further data refinement, choosing the primary thematic category, and then methodically matching the primary theme to other categories that have been judiciously coded is crucial to enabling the story or case to emerge from the data categories (Williams & Moser, 2019:52).

It is significant to note that the three methods were not used consecutively during the coding process since the researcher had to move between them to make sense of the entire data set.

The transcriptions for this study were analysed by using a Microsoft Excel sheet. It has assisted in finding codes within the transcriptions and classify them into categories to formulate the themes. Figure 3.2 below shows how the sheet was used.

| Referance | | | First level data | Density | | Code | Code | Category number | Categories | Categories | Themes |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A(1)1 | | A | don't use a lot of open source | 6 | A | Open-sourc | A,B,D,E,P,Q | 1 | ERP knowledge | 1,2,5,8,9 | Readyness |
| A(1)2 | | B | don't really have a need for it | 4 | B | Need | C,F,H,I,J,M,T,W,X | 2 | ERP advantages | 4,7,10 | Change management |
| A(1)2 | | C | online systems | 1 | C | Online | D,G,K,L,N,O,P,Q,S | 3 | ERP challenges | 3,4,6,10,11 | Costs |
| A(1)2 | | D | payroll system | 19 | D | Systems | E,G,K,P | 4 | ERP barriers | 6,7,9,10,11 | Success factors |
| A(1)2 | | D | financial system | 16 | E | Knowledge | F,I,J,M,T,U,V | 5 | ERP implementation forces | | |
| A(1)2 | | F | trade secrets | 1 | F | Secrets | L,M,N,P,Q | 6 | Risk and project management | | |
| A(1)2 | | G | people do things by hand | 6 | G | People | B,E,G,L,S | 7 | Resistance to change | | |
| A(1)3 | | H | very convenient | 6 | H | Convenient | I,J,N,Q,T,W,V | 8 | System integration | | |
| A(1)3 | | I | work from wherever | 5 | I | Anywhere | G,O,S,X | 9 | Management support | | |
| A(1)4 | D | G | people are unschooled | 11 | J | Automated | E,O,P | 10 | Insufficient planning | | |
| A(1)5 | | K | cost saving | 14 | K | Cost | H,K,N,P,Q | 11 | Vendor support | | |
| A(1)5 | | A | but it wasn't open source | 7 | L | Change | | | | | |
| A(1)8 | | B | So I don't think there's a desire or | 9 | M | Competitors | | | | | |
| A(1)10 | | J | so it's not at all mechanised | 10 | N | Time | | | | | |
| A(1)11 | | L | adopt to adapt to change very quic | 3 | O | Restrictions | | | | | |
| A(1)12 | | E | Not that I know of | 2 | P | Resources | | | | | |
| A(1)12 | | M | Not our true competitors | 7 | Q | Complex | | | | | |
| A(1)14 | | N | but not for right now | 3 | R | Expands | | | | | |
| Q(1)16 | | J | automate the manufacturing proce | 5 | S | Enthusiasm | | | | | |
| A(1)17 | | D | mandatory office packages | 9 | T | Performance | | | | | |
| A(1)17 | | D | restricted within our financial syste | 1 | U | Clients | | | | | |

**Figure 3. 2: Microsoft Excel sheet for data analysis**

The codes were created by assigning the first level of data which was extracted from the transcriptions, the codes were then further analysed into categories which assisted in developing the themes.

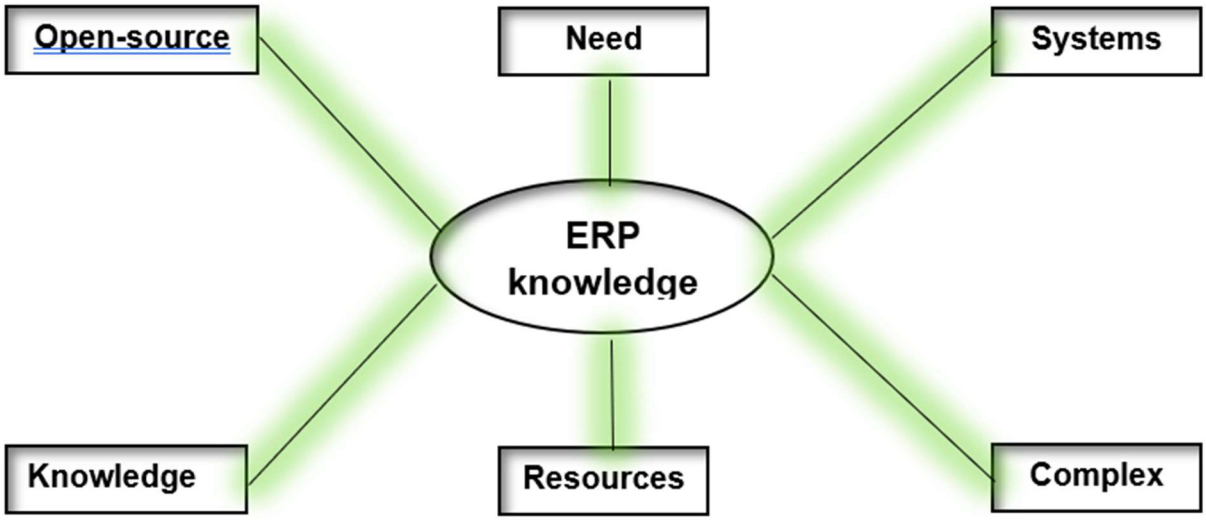



**Figure 3. 3: Network for category 'ERP knowledge'**

Figure 3.3 above shows a data network for the codes identified under the category 'ERP knowledge'. These codes are linked to this category but not limited to this category.

## 3.13. THEMES, CATAGORIES AND CODES

The purpose of this qualitative study was to determine the readiness point for manufacturing SMEs within the North-West province to implement an ERP system. The data was collected through eight different semi-structured interviews with manufacturing SMEs. The participants' responses served as the basis for the themes and was derived from the transcripts.

The following four themes were identified within the analysis process:

- Readiness
- Change management
- Costs
- Success factors

The following are the 11 categories that was identified within the analysis process:

- ERP knowledge
- ERP advantages
- ERP challenges
- ERP barriers
- ERP implementation forces
- Risk and project management
- Resistance to change
- System integration
- Management support
- Insufficient planning
- Vendor support

To show how these themes and categories are linked to each other. Table 3.2 below shows the categories that are common across identified themes.

**Table 3. 2: Identified categories and themes**

| Themes | SME readiness | Change management | Costs | Success factors |
|---|---|---|---|---|
| **Categories** | ERP knowledge | ERP barriers | ERP challenges | Risk and project management |
| | ERP advantages | Resistance to change | ERP barriers | Resistance to change |
| | ERP implementation forces | Insufficient planning | Risk and project management | Management support |
| | System integration | | Insufficient planning | Insufficient planning |

| | | | | |
|---|---|---|---|---|
| | Management support | | Vendor support | Vendor support |

Within table 3.2 above it is shown that there are commonalities between the different themes. Although each theme is standing alone, there are categories that are linked to more than one theme. From all the themes, the theme of SME readiness is the most important as it links directly with the studies title. Although it is the most important theme, the other three themes have a critical contribution towards a manufacturing SMS's point of readiness to implement an ERP system.

### 3.13.1. SME readiness

Overall SMEs are not ready for ERP implementation until their volumes have increase up to a point of where automation and integration becomes essential. Another indication is the available knowledge of ERP systems. ERP implementation within SMEs should not be considered until enough knowledge of these systems has been obtained. An SME will be ready when they have sufficient knowledge of these systems and are able to determine the point when the benefits will outweigh the disadvantages and costs involved.

From the analyses it has stood out that SMEs has very minimal knowledge of ERP systems or even simple software. Most of the participants does only know of one to four ERP systems. Also, the participants do not have a very good idea of what the advantages are of such a system. Management also contributed to the readiness factor as they are responsible for making decisions in this regard, if management does not see the need for such a system, they are not willing to invest.

*"I think the main thing that caused our immigration to this software was due to the company growing. We try to stay updated with the current technology. Because of the increase in employees, it was very helpful not like in the previous years based on paper systems."*

As indicated by this participant, their decision to implement was based on the company size becoming too big and cannot keep everything on a paper-based system. Although there is many different simple software to avoid paper-based systems, they have directly implemented an ERP system. From the participants that have already implemented an ERP system, did so for automation and only realised the other benefits afterwards.

### 3.13.2. Change management

SMEs are considered to be ready for ERP implementation in terms of their employees' low resistance to change. Due to the lower numbers of employees within these companies, the change can be managed much easier. In essence, change management is very important for any type of change within an organisation but for ERP implementation it is critical. Resistance to change could cause any ERP implementation to be unsuccessful, be underutilised, or the system implementation will take much longer and have larger training and support costs.

*"It will certainly be a challenge as change is always difficult. Management will also have to keep to the implementation processes which may be challenging as well but I believe that it will be successful."*

As with any organisation, when there is change there will be resistance unless it is being managed pro-actively. Change management is part of planning. Considering the insufficient knowledge of the participants who have already implemented their ERP systems, there was minimal post-implementation planning.

### 3.13.3. Costs

In general it appears that SMEs have the necessary financial resources available to implement an ERP system. Although this again links up with the lack of SME knowledge of ERP systems as those still considering does not know the cost

implication. As mentioned by one participant who is only nearly classified as a medium sized firm, that the system has cost them in total nearly over R1 million Rand.

*"All costs amounted to almost over R1M. This includes license cost, implementation, upgrading, course and training, software, and professional year-end tasks."*

As extracted from the analysis, there are numerous challenges and barriers to ERP adoption which could affect the budgeted costs of implementation. Thus, it has shown that project and risk management is also part of the planning process to ensure the system costs what has been expected. Vendor support has quite high costs and when not selecting the appropriate vendor for your organisation it can lead to customisation which leads to higher costs than anticipated.

### 3.13.4. Success factors

The critical success factors is linking with SMEs knowledge of ERP systems in general. SMEs with 'n lack of knowledge should not implement an ERP system as they will most probably fail. Sufficient knowledge of an ERP system must be obtained to improve successful ERP implementation of an SME. The success factors for ERP implementation ranges throughout the whole implementation. As extracted from one participant, choosing the wrong ERP vendor could cause for a lot of additional costs and enormous time being lost.

*"The program was purchased through a software supplier who did not have sufficient knowledge of the system. As a result, additional courses had to be taken which resulted in a conflict with the system due to incorrect revisions. We learned the integration and only after a fourth attempt, somebody was able to assist more appropriately."*

Choosing the correct vendor and ensuring availability of support are one of the critical success factors. One other critical success factor extracted from the transcripts were management support.

*"Management is not interested to find any other systems other than Pastel."*

If management does not display proper support for ERP implementation and does not lead employees to avoid resistance to change, the higher the chance of failure is.

## 3.14. CREDIBILITY AND VALIDITY

The credibility and validity of research findings can be increased by using the triangulation method. Credibility is revering to the trustworthiness and how believable the study is. Validity is concerned with the extent to which a study evaluates the concept, or accurately reflects, or the ideas being investigated. The fundamental biases that arise from a single method or observer can be overcome by triangulation. Triangulation can be used in qualitative studies. Data triangulation includes matters such as periods of time, people, and space (Noble & Heale, 2019:67).

In this research, data triangulation was the method used to ensure the credibility and validity of the data collected through interviews. A variety of data sources were used in this research, multiple different SMEs was interviewed. The weaknesses in the data was compensated by the strengths of other data collected.

## 3.15. ETHICAL CONSIDERATIONS

### 3.15.1. Ethical Issues

The data collected through interviews were analysed non-intrusive by not giving any specific information about a business and participating businesses will stay confidential and will only mention the type of business industry that will be participating. Furthermore, when recruiting participants, the high ethical standards for the research study were explained, and any observations will be kept confidential. All ethical issues and methods of this study and interview was clearly stated on the informed consent letter which also state that the research proposal will be going through the ethical

clearance process of the Faculty of Economic and Management Sciences Ethics Committee.

The researcher was in complete control when holding the interviews as well as when analysing the data obtained from the interviews to ensure confidentiality. Referring to the POPI Act is to protect data from theft and discrimination, the researcher will always ensure the safekeeping of all information.

### 3.15.2. Informed Consent

The purpose of the study were to perform research on the proposed topic to assist the researcher and other businesses requiring the same type of researched information. Before conducting the interview all the ethical issues were stipulated to guarantee ethical behaviour. The anonymity was maintained by analysing the data gathered from the interview without revealing any business or personal information obtained and the interviews will be safeguarded until destruction will take place. The participants were informed beforehand of the purpose of the study and that the data gathered will be used for a research project and publication purposes through the Business School of the North-West University. The participants were made aware that participation is completely voluntary and can withdraw from participating within a reasonable time before the submission date of the research project. The duration of the interview were expected to be between 15-20 minutes and was recorded for record purposes. The informed consent form used for this study is attached as **appendix B**. Unfortunately, there weren't any type of incentives except for being able to get access to the final research paper.

## 3.16. DELIMITATIONS

Delimitation is an important part of a research project because the study cannot include all variables because doing so would make it difficult to evaluate the findings and could

lead to less meaningful conclusions. Delimitations are decisions made for a particular research project that specify the parameters for the study. Delimitations are established to make sure the study's research primary and secondary objectives may be achieved.

This research is specifically based on manufacturing SMEs within the North-West province that have implemented an ERP system or are still considering. The exclusion of large organisations was done due to the study field becoming too large but also, large organisations already have in most cases implemented and have sorted out their problems. It was important to determine the readiness factor for SMEs to implement as the consequences of implementing too soon without the necessary knowledge could lead to a large enough financial loss that could cripple the company.

The second delimitation was the area in which the study was performed. This study only focussed on the North-West province due to the cost implications of the researcher to travel for interviews. Also, the researcher has personal connections within the North-West with manufacturing SMEs which makes it easier to find willing participants.

The last delimitation was that the study was aimed at SMEs within the manufacturing industry. This is due to SMEs which is not in the manufacturing industry does not have any problems with their manufacturing processes in which an ERP system can solve. Their need for such a system is much less than a manufacturing company.

## 3.17. CONCLUSION

From this chapter the conclusion can be made that manufacturing SMEs within the North-West province can more easily determine their organisations readiness to implement an ERP system. The main reason found are a lack of SME knowledge of

ERP systems. There is also a large difference between SME readiness stated through the literature and what has been found through the data analysis. SMEs are in a much better position to implement an ERP system due to costs that was lowered by ERP vendors that specifically designed ERP systems for smaller organisations.

## 3.18. CHAPTER SUMMARY

The empirical study of the research, which covered the research strategy, the research method, and the data analysis, was covered in Chapter three. To obtain the perspective of manufacturing SMEs on their company's readiness point of implementing an ERP system, a qualitative research approach was employed, which included semi-structured interviews with them. This chapter also included the process in which the data was collected and the results that was found within the transcriptions which was used to analyse.

# CHAPTER 4: CONCLUSION AND RECOMMENDATIONS

## 4.1. INTRODUCTION

In chapter three of this study, the aim was to establish the research approach and methods to have a successful analysis of the collected data. The analysis of the data has resulted in rich information in terms of achieving the research objectives. With the primary research objective being to determine the readiness point for manufacturing SMEs to implement an ERP system. The literature study in chapter two focussed on gathering secondary data so that the researcher can have a good perception of what research has already been done.

The information gathered in chapter two and three will assist manufacturing SMEs in making their decision whether they are ready to implement an ERP system. This chapter will have a discussion of the findings and will consist of the conclusions and recommendations of this research.

## 4.2. DISCUSSION OF FINDINGS

To determine the readiness point for manufacturing SMEs to implement an ERP system was quite difficult and by taking into consideration what an ERP system is. According to Khaleel and Alkhaldi (2017:41) an ERP system is a multi-module application software package which integrates key business processes. When having the interviews with the participating companies, their perception of what an ERP system is and what it is are two different perceptions. Although they do use an ERP system, they are unaware of the difference between simple software and ERP software.

*“Because of the increase in employees it was very helpful not like in the previous years based on paper systems”*

The participants have the perception that a computerised system is in fact an ERP system. Thus, SMEs does not have proper knowledge of the different types of systems

that are available to them, rather they take advantage of the first system they find. From all the interviews only one out of the eight participants knew what open-source software are. Thus, the first barrier to ERP adoption within SMEs are their lack of knowledge in this field. With four out of five participants using an ERP system, they are in fact aware of the challenges and advantages of these systems they use.

### 4.2.1. Forces to ERP implementation

The forces for SMEs to implement an ERP system has a correspondence between the participants and the literature. Although there are many different forces to adopt an ERP system from the literature and according to AboAbdo *et al.* (2019:464), there are three main drivers. These drivers have a good relationship with what was found within the analysis. From the analysis the major forces according to the participants to implement was to automate as much as the business processes, especially in their administrative departments of their businesses and to have a common database throughout the organisation. The second force found from the participants which also corresponds with the literature is to have organisational information available in real-time.

It was evident to see that through all the interviews, the participants only had the above responses and did not broaden their answers towards other benefits that such a system could bring to their organisation. From the literature it was seen that an ERP system will most likely assist the company in obtaining the competitive advantage. This does not completely correspond to the reaction of the participants with the question of if they think an ERP system assists in obtaining the competitive advantage.

*“I think none of our competitors do not have some sort of ERP system. I think making use of an ERP system is not something that will affect the competitive advantage since our competitors make use of it as well. I do not know of a company that does not have an ERP system.”*

According to the participant, an ERP system is in the modern day a requirement to do business. Thus, if your business does not have an ERP system you will rather have a competitive disadvantage instead. This statement from the participant could also connect with the literature that suggests that companies implement an ERP system due to peer pressure instead of investigating what is necessary for their company. Although there are many forces that drive SMEs to implement an ERP system there are also barriers.

### 4.2.2. Barriers to ERP implementation

One of the main barriers to ERP adoption from the literature is the cost implication. Although it is true that SMEs does not have the large amounts of available capital as larger organisations, from the participants response to their available resources. Their responses were positive and that they have the necessary financial resources to implement.

*'The organisation is prepared enough for the update or to adopt it the biggest concern we had to face was more of the human factors or human resources. This however was not a problem since employees have adapted."*

Although the participants do not see the financial implications, they however do acknowledge that they have a human resource constraint in terms of available IT knowledge. To outsource all the IT tasks within a company, there are extreme amounts of additional costs and training costs. Another barrier to ERP implementation for SMEs is the initial disruption of business processes as well as learning the new system.

*"Loading everything on the system and learning how it works."*

One benefit of ERP systems that has been designed for SMEs is that they are much more user friendly and in terms of costs, an SME can only buy the required modules from the ERP vendor instead of the whole system.

### 4.2.3. Change management

Change management is one of the most critical success factors that must be taken into consideration when deciding to implement an ERP system. If not handled correctly, resistance to change can cause failure or underutilisation of the system. There are numerous reasons for resistance to change according to the literature, but the main reasons are that the reason for change is unclear and that the users of the system are not involved.

*"Implementation was very easy since everyone agreed that it would be a very good idea and most if not all of the employees had assisted in making the transition without complications."*

Although resistance to change, according to the literature, are very likely to happen. The responses from the participants indicate that they are very positive that they will be able to manage the change of which an ERP system will bring forth. It can be noted that SMEs does have fewer system users than larger organisations and can find it easier to involve and motivate their system users.

### 4.2.4. Success factors

The success factors for ERP implementation are very broad and does assist to know what to look out for when deciding to implement an ERP system. From the data analysis there are only a few commonalities between the participants responses and the literature. The first that stood out was that management support is essential in ERP implementation. From one of the participants, management does not approve any new systems and prefers to remain with old systems, although employees feel it is time for upgrading to a better system.

*"Management is not interested to find any other systems other than Pastel."*

It is critical for management to support implementation. When there is no support from management, the ERP implementation would most probably fail.

ERP selection was also noted from one of the participants which is also a critical success factor, but which can be added from the analysis is that not only choosing the correct ERP system for your business, selecting your IT support in the case of outsourcing is also extremely important.

Training & education is very important throughout the implementation process as well as after implementation. Training of the system will be advantageous to ensure that the system is optimally used. The quotation below from one of the participants also indicate that their system can integrate with their customers but due to insufficient training they cannot use it.

*"We can integrate somewhat with SAP and the current legal issues with SAGE seem to be a problem as well."*

This quotation also links with business process reengineering which is also a critical success factor. Choosing a system with minimal customization is important. The ERP system chosen should align itself with the businesses processes.

## 4.3. CONCLUSIONS

Meeting the primary and secondary objectives outlined in chapter one of the study was the focus of this study. To accomplish this, a complete investigation and literature review on the relevant topics were conducted in chapter two, and a subsequent empirical study to determine the outcomes and findings that was conducted in chapter three.

The literature study has highlighted the importance of ERP systems and SMEs. It has also indicated all the advantages of what such a system can bring for any SME in the manufacturing sector and the benefit it holds to implement. It has shown the forces that causes SMEs to consider implementation. The literature has also indicated all the disadvantages and barriers for ERP implementation.

From the empirical study it was clearly illustrated that the readiness for manufacturing SMEs heavily rely on the forces that are created through organisational growth. SMEs does not see the necessity to implement an ERP system when they have only a few transactions being done in the company. But when thousands of transactions are being processed within the company, an ERP system can dramatically reduce the amount of labour costs through automation and integration. The empirical study also highlighted that SMEs only realise the actual benefits in which an ERP system brings such as being able to work from anywhere and having real-time information.

This study has also highlighted that SMEs does not have very good knowledge of IT and ERP systems in general. As their IT are being outsourced to a third party and is also responsible for their ERP system. It was only with one participant who had a dedicated IT employee. SMEs make the mistake of taking the first ERP system that comes their way, or the first one they hear of. SMEs do not conduct proper research on the topic before deciding and this causes some to be completely happy and some to be very disappointed in the system they have adopted.

From the literature, the cost of implementing an ERP system is extremely high and suggests that an onsite server is recommended over the long term. The empirical study has mostly concluded the opposite. From the participants with online ERP systems are more satisfied than those with onsite systems. The online system they use are Sage online or Pastel Evolution. These online systems make use of the IoT which brings these systems main advantage which is enabling the systems users to access information from anywhere. Then, the costs of ERP systems have reduced dramatically in terms of ERP vendors that has enabled SMEs to buy only the modules required for their organisation. The alternative such as open-source software has not gained any positivity from the participants.

Although from the literature there are many benefits when using open-source software, the empirical study has clearly indicated that SMEs does not believe in open-source

software. Most of the participants has indicated that open-source software will cost them more over the long term due to the costs of system failure and training costs.

## 4.4. RECOMMENDATIONS

Manufacturing SMEs within the North-West province could have many different reasons to why they would consider ERP implementation. There are two broad recommendations from the researcher for SMEs considering ERP implementation. These are:

- The first recommendation would be that management and or head of IT should firstly conduct proper research on the topic to broaden their knowledge on ERP systems. They must determine their organisations needs and then search for an ERP system that will best suit their needs and have the best fit for their organisational processes. Insufficient knowledge on the topic can cause dissatisfaction or even failure. While making the decisions between different systems, they must keep in mind to decide between onsite or online systems. As both have their advantages over each other.

- The second recommendation would be to consider the company's readiness for ERP implementation in terms of weighing up the benefits and disadvantages of implementation up against each other properly. SMEs can determine whether all the advantages can outweigh the disadvantages as well as the cost implications. If a company has enormous amounts of transactions, many debtors and creditors and management find it important to have real-time information, then considering an ERP system would be beneficial.

## 4.5. IMPLEMENTATION PLAN

ERP implementation can become somewhat complicated for an SME especially without enough knowledge of such a system. Below are a recommended steps in planning ERP implementation:

1. Firstly, management and their IT department must do extensive research on ERP systems to familiarise themselves about the following:

- Advantages and benefits of an ERP system which will include things like automation, integration, real-time information, improved stock holding and improved customer service.
- Disadvantages of an ERP system which will include things like the cost of the system, resources required to implement, improved knowledge required of users and time of implementation.
- Critical success factors required to implement an ERP system.
- Onsite and cloud ERP systems.

2. Secondly, determine whether the advantages and benefits outweigh the disadvantages. Simply the system should indicate more benefits such as cost savings, improved customer service and system integration than disadvantages such as the cost of the system. In most cases cost savings and improved customer service are received through automation and integration. When the advantages and benefits of an ERP system outweighs the disadvantages, ERP implementation should be considered.

3. Thirdly, when ERP implementation has been decided on, the critical success factors as mentioned in the literature review of chapter two should be taken into consideration.

4. Fourthly, critically set up an implementation plan which will adhere to all the critical success factors to avoid any implications such as going over the budget or expected timeframe.

ERP implementation should succeed when the above have been adhered to and the SME has top management support. When the second step of this recommended plan has more disadvantages than advantages, it should be an indication that the SME is not ready to implement an ERP system.

## 4.6. CRITICAL EVALUATION OF THE STUDY

The success of the study depends on the accomplishment of the research objectives, which were outlined in chapter one of this study. The research process that was followed and the data analysis was focussing on to reach these objectives and to come to certain conclusions. The primary and secondary research objectives was in support of this studies title.

### 4.6.1. Achieving the primary objective

The primary objective of this research is to explore the challenges, opportunities, and advantages of implementing an ERP system. Thus, determining the point of readiness of manufacturing SMEs to implement an ERP system as well as the possibilities of acquiring open-source ERP systems. This objective was achieved by analysing the data collected from the interviews which concluded. The point of readiness was determined through identifying each participants readiness point and finding the correlations between them.

The point of readiness for an SME can be determined by weighing the advantages and disadvantages of implementing an ERP system up against each other. The concluded results indicate that the point of readiness is linked to the amount of transactions are being processed within the company or how much the administrative work becomes. The moment an SME can determine that these volumes of work becomes too much and the costs of processing these work tasks become higher than the costs of implementing an ERP system. Then it will be advisable to implement an ERP system.

There are also numerous benefits of implementing an ERP system and when these benefits become very important for the company, then implementation should also be considered.

When an SME feel that they are considering an ERP system but does not have the readiness indicators as mentioned above, it does not mean implementation cannot be done. It simply states that the company is thinking ahead and are being innovative. This will allow the company to do proper planning of which system will have the most benefits for the specific company and will allow to proactively bring ERP implementation into the company's long-term strategy. Also avoiding losing costs already undergone for the current systems and could still use them optimally.

When the benefits do not outweigh the advantages, ERP implementation should not be rushed as it could have catastrophic consequences. For example, if you are only manufacturing one or two items per month and has only one or two sales per month, ERP implementation costs will be unnecessary. Modern ERP systems allow to only implement the modules required, making the readiness point for SMEs to implement earlier.

### 4.6.2. Achieving the secondary objectives

The secondary objectives of this study were formulated in support of the primary objective. All four of the secondary objectives was achieved in contrast to achieve the primary objective. As set out below, each secondary objective contributed to achieving the primary objective.

i. **Investigate the different challenges and pitfalls in implementing an ERP system.** In this study the challenges and pitfalls have a high correspondence between the literature and the data collected. Change management is one of

the challenges that was very much emphasised in the literature as being one of the most difficult with ERP implementation. This do however differ from the analysis, change management does not seem to be a big challenge within SMEs, although they do confirm it will be a challenge, it will be much easier overcome. Within the literature the cost factor of ERP systems is also different from the analysis. The cost of an ERP system is still very important to acknowledge, but with the SMEs that did choose the correct system, the cost factor was not a big problem and is much cheaper than anticipated by the researcher.

The challenge of human resources was mentioned in the literature, but the analysis has emphasised that SMEs find it challenging to implement such a system without the necessary IT support within the company. SMEs make use of external IT support and does contribute to the support costs required to handle any issues within the system.

ii. **Investigate the different advantages and benefits of implementing an ERP system.** For this objective, there are no real differences between the literature and the data collected. From the data collected, there are three main benefits that was emphasised:

- Automation of business processes, mostly within the administrative and sales departments.
- Integration between different departments, there is no double entries within the system and reduces labour costs information that is captured between departments. With IoT integration, accessibility to the system is given from anywhere the internet is available.
- Real-time information, Improvement for management to make decisions based on current information and not after a period.

These benefits mentioned also relates to the forces of ERP implementation. The above benefits become critical for an SME which is growing at a fast pace.

iii. **Investigate the possibility of manufacturing SMEs to implement open-source ERP systems.** The main reasons for SMEs not to implement open-source software within their organisation were due to their shortcomings of knowledge of these systems and feel that they will end up having the system to cost them more than a proprietary ERP system. When an SME have the human resources available within the company, open-source software should be considered as the most expensive resource factor is already in possession of the company. When human resources are not available, it would be wise to make use of a proprietary system as vendor support will assist in human resource shortcomings. In the literature the same were mentioned, but do not emphasise the requirement of available human resources, rather focus on the benefits of open-source software, especially the lost cost benefit.

iv. **Investigate the point of readiness for a manufacturing SME to consider the implementation of an ERP system.** A formula was found within the literature to determine the ROI in terms of trying to determine whether it will be beneficial for a company to implement an ERP system in terms of costs. The data collected does agree with this method but there are many other factors to take into consideration when making the decision whether the company is ready. Even when the costs barely say that the company is ready to implement, some of the benefit factors should be included, such as the benefit of real-time information. This benefit does not have a direct cost saving benefit, but does hold in a large benefit for faster decision making. The costs of ERP implementation should form part of the decision and does remain a critical factor, but must still be linked to the weighing of the advantages of having the system and the disadvantages of not having the system.

## 4.7. SUGGESTIONS FOR FUTURE RESEARCH

Through this qualitative research, some new avenues were highlighted to further investigate. There were some new questions that came to mind when this study was

conducted. The future research could focus on to determine exactly how beneficial an ERP system is for an SME and reasons why SMEs with large volumes of transactions have not considered implementation. As technology advances at a rapid pace and ERP vendors that constantly look for new ways in which to assist SMEs to afford an ERP system, could lead to more research on why SMEs are not implementing. Lastly, some research could be done to determine the relationship between ERP implementation and the knowledge which consists within the organisation.

## 4.8. CHAPTER SUMMARY

This chapter has concluded the findings of this study and has delivered valuable information. An in-detail discussion was done on the findings which highlighted the main points of this study. The discussion included the forces for SMEs to consider ERP implementation, the barriers that are discouraging SMEs to implement, how the change management is playing a role in implementation and the success factors that are critical when implementing an ERP system. The discussion topics for this chapter has been extracted from the analysis and themes for this study.

The conclusions for this study were done, which indicates the readiness point for SMEs to implement an ERP system. Further, this chapter also included the recommendations made by the researcher for SMEs to consider when they are considering ERP implementation.

In this chapter a critical evaluation was done to determine whether the studies primary and secondary objectives have been reached. These objectives have been reached and a discussion was done on what the point of readiness for a manufacturing SME is to implement. Throughout this chapter an evaluation was done between the literature study of chapter two and the empirical study of chapter three. Indicating where the data that was collected and analysed have a difference in relation to the literature.

The readiness point for a manufacturing SME to implement an ERP system has been critically evaluated from the results found in empirical study and SMEs could be using these results as a very good guideline in determining their company's readiness. Suggestions for future research was also included in this chapter.

## REFERENCE LIST


Abd Elmonem, M.A., Nasr, E.S. & Geith, M.H. 2016. Benefits and challenges of cloud ERP systems–A systematic literature review. *Future Computing and Informatics Journal*, 1(1-2):1-9.

AboAbdo, S., Aldhoiena, A. & Al-Amrib, H. 2019. Implementing Enterprise Resource Planning ERP system in a large construction company in KSA. *Procedia Computer Science*, 164:463-470.

Ahmad, S., Wasim, S., Irfan, S., Gogoi, S., Srivastava, A. & Farheen, Z. 2019. Qualitative vs. Quantitative Research. *Journal of Evidence Based Medicine and Healthcare,* 6(43):2828-2832.

Al-Ababneh, M. 2020. Linking ontology, epistemology and research methodology. *Science & Philosophy*, 8(1):75-91.

Alaskari, O., Pinedo-Cuenca, R. & Ahmad, M. 2021. Framework for implementation of Enterprise Resource Planning (ERP) Systems in Small and Medium Enterprises (SMEs): A Case Study. *Procedia Manufacturing*, 55:424-430.

Alharahsheh, H.H. & Pius, A. 2020. A review of key paradigms: Positivism VS interpretivism. *Global Academic Journal of Humanities and Social Sciences*, 2(3):39-43.

Assarroudi, A., Heshmati Nabavi, F., Armat, M.R., Ebadi, A. & Vaismoradi, M. 2018. Directed qualitative content analysis: the description and elaboration of its underpinning methods and data analysis process. *Journal of Research in Nursing*, 23(1):42-55.

Bell, A. 2021. Cross-sectional and longitudinal studies. *Research Methods in the Social Sciences: an AZ of Key Concepts*, 19(2):72.

Bharathi, V. & Yl, R. 2012. A study on ERP adoption in SMEs for improving operational performance and ROI. *Available at SSRN 2186257*,

Birthare, S.K. & Sharma, R. 2020. Study on migration of on-premise ERP to SaaS product. *International Research Journal of Modernization in Engineering Technology and Science*, 2.

Bryman, A. & Buchanan, D.A. 2018. Unconventional methodology in organization and management research. *Oxford University Press.*

DeJonckheere, M. & Vaughn, L.M. 2019. Semistructured interviewing in primary care research: a balance of relationship and rigour. *Family medicine and community health*, 7(2):1-8.

Department of Small Business Development (South Africa). 2019. Revised Schedule 1 of the National Devinition of Small Enterprise in South Africa. (Notice 399). *Government Gazette,* 42304:110-111, 15 March.

Dieringer, D.S. 2004. ERP implementation at Nestle. *Academia accelerating the world's research*.

Fisher, C. 2018. Cloud versus on-premise computing. *American Journal of Industrial and Business Management*, 8(09):1991.

Fougatsaro, V. G. (2009). *A study of open source ERP systems* (Thesis for the Master's degree in Business Administration). https://efaidnbmnnnibpcajpcglclefindmkaj/https://www.diva-portal.org/smash/get/diva2:832902/FULLTEXT01.pdf Date of access: 05 Apr. 2022.

Ganapathy, N. 2018. ERP at Anika Fragrances Pvt. Ltd: Should We Implement on the Cloud. *Journal of Entrepreneurship and Management*, 7(2):41.

Goumas, S., Charamis, D. & Tabouratzi, E. 2018. Accounting benefits of ERP systems across the different manufacturing industries of SMEs. *Theoretical Economics Letters,* 8(6):1232-1246.

Gunjal, S. 2019. Enterprise resource planning (ERP as a change management tool. *Journal of Management*, 6(2):157-167.

Gupta, S., Misra, S.C., Singh, A., Kumar, V. & Kumar, U. 2017. Identification of challenges and their ranking in the implementation of cloud ERP: A comparative study for SMEs and large organizations. *International Journal of Quality & Reliability Management*, 34(7):1056-1072.

Haaland, E. & Olsen, O.A. 2020. *Managing change in ERP implementation projects: A case study in an SME context.* University of Agder.

Haddara, M. & Moen, H. 2017. User resistance in ERP implementations: A literature review. *Procedia Computer Science*, 121:859-865.

Hasheela-Mufeti, V. & Smolander, K. 2017. What are the requirements of a successful ERP implementation in SMEs? Special focus on Southern Africa. *International Journal of Information Systems and Project Management*, 5(3):5-20.

Hunton, J.E., Lippincott, B. & Reck, J.L. 2003. Enterprise resource planning systems: comparing firm performance of adopters and nonadopters. *International Journal of Accounting information systems*, 4(3):165-184.

Jager, J., Putnick, D.L. & Bornstein, M.H. 2017. II. More than just convenient: the scientific merits of homogeneous convenience samples. *Monographs of the Society for Research in Child Development*, 82(2):13-30.

Jituri, S., Fleck, B. & Ahmad, R. 2018. A methodology to satisfy key performance indicators for successful ERP implementation in small and medium enterprises. *International Journal of Innovation, Management and Technology*, 9(2)79-84.

Joia, L.A. & dos Santos Vinhais, J.C. 2017. From closed source to open source software: Analysis of the migration process to Open Office. *The Journal of High Technology Management Research*, 28(2):261-272.

Kandeh, A.T., Botha, R.A. & Futcher, L.A. 2018. Enforcement of the Protection of Personal Information (POPI) Act: Perspective of data management professionals. *South African Journal of Information Management*, 20(1):1-9.

Kesmodel, U.S. 2018. Cross-sectional studies–what are they good for? *Acta obstetricia et gynecologica Scandinavica*, 97(4):388-393.

Khaleel, Y.K. & Alkhaldi, A.N. 2017. Enterprise resource planning (ERP) model for small and medium sized manufacturing firms based on UML. *International Journal of Information, Business and Management*, 9(3):41.

Khatri, K.K. 2020. Research Paradigm: A Philosophy of Educational Research.
Kiran, T. & Reddy, A. 2019. Critical success factors of ERP implementation in SMEs. *Journal of Project Management*, 4(4):267-280.

Kocovic, P. 2008. Four laws for today and tomorrow. *Journal of applied research and technology*, 6(3):133-146.

Kurnia, S., Linden, T. & Huang, G. 2019. A hermeneutic analysis of critical success factors for Enterprise Systems implementation by SMEs. *Enterprise Information Systems*, 13(9):1195-1216.

Landreneau, K.J. & Creek, W. 2009. Sampling strategies. *Available on: http://www. natco1. org*,

Lee, H.-Y. & Wang, N.-J. 2019. Cloud-based enterprise resource planning with elastic model–view–controller architecture for Internet realization. *Computer Standards & Interfaces*, 64:11-23.

Lester, J.N., Cho, Y. & Lochmiller, C.R. 2020. Learning to do qualitative data analysis: A starting point. *Human Resource Development Review*, 19(1):94-106.

LI, B.M.S. 2013. Keeping Up with Moore's Law. *Dartmouth Undergraduate Journal of Science*:20-23.

Lopez, V.W.B. 2018. Beyond knowledge integration barriers in ERP implementations: An institutional approach. *Journal of information and organizational sciences*, 42(2):159-178.

Motahar, S.M., Mukhtar, M., Mohd Satar, N.S., Ma'arif, D. & Yusnorizam, M. 2018. Revisiting the diversification on the implementation of open source ERP teaching models. *Jour of Adv Research in Dynamical & Control Systems*, 10(9):2379-2385.

Nair, J. & Chellasamy, A. 2020. Technological change perspective for ERP implementation in small and medium enterprises. In. *Start-Ups and SMEs: Concepts, Methodologies, Tools, and Applications*: IGI Global. pp. 1506-1516.

Nikitović, M. & Mahmutović, A. 2019. Hidden costs of ERP Implementation. In. 2019 42nd International Convention on Information and Communication Technology, Electronics and Microelectronics (MIPRO). IEEE. pp. 1314-1318.

Noble, H. & Heale, R. 2019. Triangulation in research, with examples. *Research made simple*, 22(3):67-68.

Nwaogazie, I.L., Sam, M., Enciso, R. & Gonsalves, E. 2019. Probability and non-probability rainfall intensity-duration-frequency modeling for Port-Harcourt metropolis, Nigeria. *International Journal of Hydrology*, 3(1):66-75.

Olson, D.L., Johansson, B. & De Carvalho, R.A. 2018. Open source ERP business model framework. *Robotics and Computer-Integrated Manufacturing*, 50:30-36.

Patino, C.M. & Ferreira, J.C. 2018. Inclusion and exclusion criteria in research studies: definitions and why they matter. *Jornal Brasileiro de Pneumologia*, 44(2):84-84.

Rahi, S. 2017. Research design and methods: A systematic review of research paradigms, sampling issues and instruments development. *International Journal of Economics & Management Sciences*, 6(2):1-5.

Roulston, K. & Choi, M. 2018. Qualitative interviews. *The SAGE handbook of qualitative data collection*:233-249.

Saa, P., Cueva Costales, A., Moscoso-Zea, O. & Luján-Mora, S. 2017. Moving ERP systems to the cloud-data security issues. *Journal of Information Systems Engineering,* 2(4):21.

Sadat Safavi, N., Amini, M., Abdollahzadegan, A. & Zakaria, N.H. 2013. An effective model for evaluating organizational risk and cost in ERP implementation by SME. *IOSR Journal of Business and Management (IOSR-JBM)*, 10(6):70-75.

Sancar Gozukara, S., Tekinerdogan, B. & Catal, C. 2022. Obstacles of on-premise enterprise resource planning systems and solution directions. *Journal of Computer Information Systems*, 62(1):141-152.

Sari, M.W. & Santoso, B. 2021. Analysis of Enterprise Resource Planning (ERP) system implementation for manufacturing in Indonesia. In. Journal of Physics: Conference Series. IOP Publishing. p 012116.

Savelkouls, F.J.H.M. 2017. *Overcoming resistance in the post-implementation phase of ERP implementation: An application at Heijmans Infra.* TUE, School of Industrial Engineering. (Master's degree). Available from: https://efaidnbmnnnibpcajpcglclefindmkaj/https://pure.tue.nl/ws/portalfiles/portal/80208868/Master_Thesis_Final_Frank_Savelkouls.pdf Date of access: 13 Jul. 2022.

Seethamraju, R. 2015. Adoption of software as a service (SaaS) enterprise resource planning (ERP) systems in small and medium sized enterprises (SMEs). *Information systems frontiers*, 17(3):475-492.

Shang, S. & Seddon, P.B. 2000. A comprehensive framework for classifying the benefits of ERP systems. *AMCIS 2000 proceedings*:39.

Šimović, V., Varga, M. & Soleša, D. 2020. Analysis of possible advantages and constraints of ERP systems. *Ekonomija: teorija i praksa*, 13(4):41-56.

Sneller, R. 2014. *A Guide to ERP: Benefits, Implementation and Trends*. 1st ed. bookmoon.com.

Stewart, T. 2019. *Risk Mitigation for SMEs Implementing ERPs*. University of Oregon. (Master of Science degree). Available from: https://efaidnbmnnnibpcajpcglclefindmkaj/https://scholarsbank.uoregon.edu/xmlui/bitstream/handle/1794/25130/Stewart_2019.pdf?sequence=1&isAllowed=y Date of access: 16 Jul. 2022.

Tavana, M., Hajipour, V. & Oveisi, S. 2020. IoT-based enterprise resource planning: Challenges, open issues, applications, architecture, and future research directions. *Internet of Things*, 11(1):1-27.

Tsai, J.C.-A., Jiang, J.J., Klein, G. & Hung, S.-Y. 2022. Legacy information system replacement: Pursuing quality design of operational information systems. *Information & Management*, 59(2):103592.

van Wyk, T. 2019. Accessing information in South Africa. *Freedom of information and social science research design*:24-37.

Wang, X. & Cheng, Z. 2020. Cross-sectional studies: strengths, weaknesses, and recommendations. *Chest*, 158(1):65-71

Weller, S.C., Vickers, B., Bernard, H.R., Blackburn, A.M., Borgatti, S., Gravlee, C.C. & Johnson, J.C. 2018. Open-ended interview questions and saturation. *PloS one*, 13(6):1-10

Williams, M. & Moser, T. 2019. The art of coding and thematic exploration in qualitative research. *International Management Review*, 15(1):45-55.

Woiceshyn, J. & Daellenbach, U. 2018. Evaluating inductive vs deductive research in management studies: Implications for authors, editors, and reviewers. *Qualitative Research in Organizations and Management: An International Journal*, 23(2):183-195.

Yosoenarto, R.P.N., Handayani, P.W. & Pinem, A.A. 2018. Readiness framework of Enterprise Resource Planning (ERP) implementation at Small and Medium Company (SME). In: Isaias, P., Nunes, M.B., Powel, P. & Rodrigues, L., eds. *Conference proceedings.* 11th IADIS International Conference Information Systems, Lisbon Portugal. pp. 137-144.

Zach, O., Munkvold, B.E. & Olsen, D.H. 2014. ERP system implementation in SMEs: exploring the influences of the SME context. *Enterprise Information Systems*, 8(2):309-335.

Zadeh, A.H., Akinyemi, B.A., Jeyaraj, A. & Zolbanin, H.M. 2018. Cloud ERP systems for small-and-medium enterprises: A case study in the food industry. *Journal of Cases on Information Technology (JCIT)*, 20(4):53-70.

## APPENDIX A: INTERVIEW QUESTIONS

## Title of study: Investigating the point of readiness for manufacturing SMEs to implement an Enterprise Resource Planning system.

Small and medium-sized enterprises (SMEs) in the manufacturing industry have many different challenges and determining when their company is ready for implementing an Enterprise Resource Planning (ERP) system is yet a difficult and uncertain task. In addition, SMEs do not necessarily know which options are available to consider such as open-source ERP solutions. This interview will enable the researcher to determine the point of readiness for SMEs to implement.

| **Please note:** |
| --- |
| This interview will only be conducted with SMEs in the manufacturing sector in the North-West province in pre-selected areas. |

All information obtained through this interview will be kept **confidential** and will only be used for academic purposes.

## Section A

Statistical demographic information of interviewee (for statistical purposes only)

A1: Age category

| | |
| --- | --- |
| Younger than 30 years | 1 |
| 30 – 39 years | 2 |
| 40 – 49 years | 3 |
| 50 years and older | 4 |

A2: The highest level of education

| | |
| --- | --- |
| Primary school education | 1 |
| High School education (Grade 12) | 2 |
| Undergraduate or equivalent degree | 3 |
| Postgraduate or equivalent degree | 4 |
| Master's degree | 5 |
| Other | 6 |

## Section B

Company demographic information

B1: When did the business start?

| | |
|---|---|
| Less than 5 years ago | 1 |
| 5-10 years ago, | 2 |
| 10-20 years ago, | 3 |
| More than 20 years ago | 4 |

B2: What is the legal form of the business?

| | |
|---|---|
| Sole proprietor | 1 |
| Partnership | 2 |
| Close corporation | 3 |
| Private company | 4 |
| Other | 5 |

B3: In which sector is the business and what do you manufacture?

| | |
|---|---|
| Chemicals | 1 |
| Food | 2 |
| Equipment | 3 |
| Oil/gas | 4 |
| Product line manufacture | 5 |
| Other | 6 |
| If other, please specify: | |

B4: How would you classify the size of your business?

| | |
|---|---|
| Micro | 1 |
| Small | 2 |
| Medium | 3 |
| Large | 4 |

B5: What is the number of full-time employees in the business?

| | |
|---|---|
| Fewer than 10 employees | 1 |
| Between 11 and 50 employees | 2 |
| Between 51 and 250 employees | 3 |
| More than 250 employees | 4 |

B6: What is the estimated annual turnover for the business?

| | |
|---|---|
| Between R0 and R10 million | 1 |
| Between R10 million and R50 million | 2 |
| Between R50 million and R170 million | 3 |
| More than R170 million | 4 |

B6: Which of the following would be a major objective for the business in the next three years?

| | |
|---|---|
| To reduce in size | 1 |
| To stay the same | 2 |
| To grow | 3 |

(Note to self, if the results are skewed, ask the question whether they make use of a labour broker)

## Section C

Question 1

How familiar are you with open-source tools and to what extent did you receive training on open-source software?

Question 2

From your perspective, broadly specify the benefits your business would receive or is receiving from using an ERP system. If your organisation has already implemented an ERP system, does your organisation make use of all the benefits?

Question 3

Broadly elaborate on whether you would agree if your organisation had or has the financial, technological, and human resources available to adopt an ERP system.

Question 4

Please specify whether, in your business, open-source ERP tools would have or had made a reduction in operational costs, improve customer service, reduce license costs, and reduced hardware upgrade costs.

Question 5

Broadly elaborate on the pressure points causing your organisation to consider ERP implementation or have caused it to implement it.

Question 6 – (When already implemented)

At what point in your organisation's existence did your organisation decide to implement an ERP system? What were the total cost of implementation and the cost of the system?

Question 7 – (When considering implementation)

Are you currently considering an ERP system for your organisation? Which ERP system are you considering and what is the cost implication?

Question 8

Please elaborate on the enthusiasm management has or had to adopt and your employees' enthusiasm for adopting an ERP system.

Question 9

Broadly elaborate on whether you would agree that an ERP system will increase employee performance and motivation.

Question 10

Broadly specify with your knowledge the challenges and barriers to ERP adoption that your organisation has.

Question 11

Do you think the company's management will successfully manage the change that an ERP system will bring?

Question 12

With your knowledge, do your customers, suppliers or competitors use an ERP system?

Question 13

Broadly elaborate on whether you think, an ERP system has a positive contribution to your organisation and whether you think an ERP system will increase your company's competitive advantage.

Question 14

According to your knowledge, which ERP systems do you know of?

Question 15

Do you think your organisation is ready to implement an ERP system? If already implemented, do you think your organisation was ready?

## APPENDIX B: CONSENT FORM

Dear participant,

Since you have recently been involved in implementing or are busy implementing or considering the implementation of an ERP system. You are invited to participate in this research study titled: Investigating the point of readiness for manufacturing SMEs to implement an Enterprise Resource Planning system, as part of my Master of Business Administration research project.

The enclosed interview questions have been designed to collect information on determining the readiness of an SME to implement an ERP system as well as what possibilities arise from open-source software. Participation in this research is completely voluntary and can withdraw from participating within a reasonable time before the submission date. The responses will only be used for this research project and will remain confidential. None of the interview question's responses can be cross-referenced back to the participant nor will they be shared with any third party. Any

information obtained will be safeguarded until destruction will take place. There will not be any type of incentives except for being able to get access to the final research paper.

Upon agreeing to participate in this research project. The interview should take approximately 15 to 20 minutes to complete.

If there are any questions regarding this project, please feel free to contact my study leader Johannes Coetzee at Johannes.coetzee@nwu.ac.za / 082 821 7177.

Thank you for your participation.

Kind regards

_____ 11/10/2022

Jaco du Plessis Date

I hereby willingly participate in this interview and understand the contents of this letter.

_____ _____

Signature: Participant Date

## APPENDIX C: TRANSCRIPTIONS

| | |
|---|---|
| Transcription details | Company name of participant |
| Interviewer: Jaco du Plessis (JD) | Interviewee: Name of interviewee |
| Key: Q(3)1: Question(Interview Number)Count of Questions | Key: A(3)1: Answer(Interview Number)Count of questions |

| | | | | |
|---|---|---|---|---|
| | **Intro.** | **0:00:00** | | **Informs the interviewee that the session is recorded and receives consent and the interviewee accepts** |
| Q(3)1 | JD | 0:00:06 | QUESTION 1 | How familiar are you with open-source tools and to what extent did you receive training on open-source software? |
| A(3)1 | F | 0:00:24 | | I have used open source when I did my A+, so I know somewhat about open source, the company's staff however do not know open source. I have tried to get them on the most standard programs but this is why I tend to stay away from open source software. |
| Q(3)2 | JD | 0:01:12 | | Therefore, you have experience with open source, but not within the business itself. |
| A(3)2 | | 0:01:14 | | No, not within the business |
| Q(3)3 | JD | 0:01:15 | QUESTION 2 | From your perspective, broadly specify the benefits your business would receive or is receiving from using an ERP system. If your organization has already implemented an ERP system, does your organization make use of all the benefits? |

| | | | | |
|---|---|---|---|---|
| A(3)3 | F | 0:01:31 | | This is Pastel I assume, at this moment we are already making use of pastel, within the Pastel revolution. Then as I said we do not use all of the programs, we do use some of them. The ones that are relevant to our business such as stocktaking, production, sales and modules for the financial aspects of the business. This is due to everything working together, the stock is added to it and we know how much of each product is available. How many we have in stock and how many has been sold.<br><br>This is all compiled together in one program |
| Q(3)4 | JD | 0:04:16 | QUESTION 3 | Broadly elaborate on whether you would agree if your organization had or has the financial, technological, and human resources available to adopt an ERP system. |
| A(3)4 | F | 0:04:28 | | Yes, as I have said, our ERP is currently running on the system, so technologically we are sorted. I see to that we are going to upgrade our systems in the near future. I think we are on the 7$^{th}$ version and need to update to the 10$^{th}$ if I recall correctly. |
| Q(3)5 | JD | 0:08:01 | QUESTION 4 | Please specify whether, in your business, open-source ERP tools would have or had made a reduction in operational costs, improve customer service, reduce license costs, and reduced hardware upgrade costs. |
| A(3)5 | F | 0:08:17 | | We do not, the cost would have amounted to the same, if we had to go that route we would probably run Linux software. Open source is not always freeware so |

| | | | | |
|---|---|---|---|---|
| | | | | many times there is still cost to things. The training cost and reduction, I do not think there would be a reduction cost since Pastel is the standard software used. |
| Q(3)6 | JD | 0:11:06 | QUESTION 5 | Broadly elaborate on the pressure points causing your organization to consider ERP implementation or have caused it to implement it. |
| A(3)6 | F | 0:11:24 | | Well Pastel has a type of 'hierarchy' based system, so the employees needs permission to access some of the files. The problem we had was that our system made the employee administrator since she is well known with Pastel and this even |
| Q(3)7 | JD | 0:12:02 | QUESTION 6 | At what point in your organization's existence did your organization decide to implement an ERP system? What were the total cost of implementation and the cost of the system? |
| A(3)7 | F | 0:12:58 | | I would say it was about 10 years ago when the company was a bit bigger. The company consisted of a few smaller companies of which some of them had expanded and moved away. |
| Q(3)8 | JD | 0:14:57 | QUESTION 7 | Are you currently considering an ERP system for your organization? Which ERP system are you considering and what is the cost implication? |

| | | | | |
|---|---|---|---|---|
| A(3)8 | F | 0:15:00 | | N/A |
| Q(3)9 | JD | 0:17:51 | QUESTION 8 | Please elaborate on the enthusiasm management has or had to adopt and your employees' enthusiasm for adopting an ERP system. |
| A(3)9 | F | 0:18:05 | | That was about 50/50 some of the people who already used the program could understand it and just carry on and the other people or employees did not so they were not very enthusiastic about using it |
| Q(3)10 | JD | 0:20:35 | QUESTION 9 | Broadly elaborate on whether you would agree that an ERP system will increase employee performance and motivation. |
| A(3)10 | F | 0:20:46 | | It is for sure much better since it makes stock count a lot easier and it is a faster process to complete. Did have a positive effect on production |
| Q(3)11 | JD | 0:21:28 | QUESTION 10 | Broadly specify with your knowledge the challenges and barriers to ERP adoption that your organization has. |

| | | | | |
|---|---|---|---|---|
| A(3)11 | F | 0:21:46 | | Most of Pastels' formulas with the same as Excel however the last couple of times we had to change and adapt so that it would be compatible with our current version of pastel |
| Q(3)12 | JD | 0:24:50 | QUESTION 11 | Do you think the company's management will successfully manage the change that an ERP system will bring? |
| A(3)12 | F | 0:25:05 | | An employee that is good with pastel and that helps with the management of the system so if something is hidden or if something happened and we need to evaluate the crisis or the incident we have someone that can do and apply the needed process |
| Q(3)13 | JD | 0:26:36 | QUESTION 12 | With your knowledge, do your customers, suppliers or competitors use an ERP system? |
| A(3)13 | F | 0:26:46 | | I do know our customer has a system that they use not the same as ours but I do know that they make use of such a system |
| Q(3)14 | JD | 0:29:30 | QUESTION 13 | Broadly elaborate on whether you think an ERP system has a positive contribution to your organization and whether you think an ERP system will increase your company's competitive advantage. |

| | | | | |
|---|---|---|---|---|
| A(3)14 | F | 0:29:50 | | I cannot really say if it will give us a competitive advantage. Since we are one of very few companies in this field. Since there are not many of us or of this company I will not be able to say for sure if it would have an advantage. |
| Q(3)15 | JD | 0:31:12 | QUESTION 14 | According to your knowledge, which ERP systems do you know of? |
| A(3)15 | F | 0:31:24 | | You know of the Weiner that I had mentioned earlier that the mine makes use of. I think it is oracle-based. I also know of the one we use which is Pastel, and I know of Sage. |
| Q(3)16 | JD | 0:32:55 | QUESTION 15 | Do you think your organization is ready to implement an ERP system? If already implemented, do you think your organization was ready? |
| A(3)16 | F | 0:33:00 | | I think we were prepared since we already have someone that understood the software and could assist with orientation to those who did not understand it completely |

# ADDENDUM A: ETHICAL CLEARANCE

Private Bag X1290, Potchefstroom
South Africa 2520

Tel: 018 299-1111/2222
Fax: 018 299-4910
Web: http://www.nwu.ac.za

**Senate Committee for Research Ethics**
Tel: 018 299-484
Fezlwe.Mselenl@nwu.ac.za

9 November 2022

## ETHICS APPROVAL LETTER OF STUDY

Based on approval by the **Economic and Management Sciences Research Ethics Committee (EMS-REC)** on 28/10/2022, the Economic and Management Sciences Research Ethics Committee hereby **approves** your study as indicated below. This implies that the North-West University Senate Committee for Research Ethics (NWU-REC) grants its permission that, provided the special conditions specified below are met and pending any other authorisation that may be necessary, the study may be initiated, using the ethics number below.

**Study title: Investigate the point of readiness for manufacturing SMEs to implement an ERP system**
**Study Leader/Supervisor (Principal Investigator)/Researcher): Mr J Coetzee - MBA**
**Student: du Plessis, SJ (23699930)**

| N | W | U | - | 0 | 0 | 7 | 3 | 0 | - | 2 | 2 | - | A | 4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Institution | | | | Study Number | | | | | | Year | | | Status | |

Status: S = Submission; R = Re-Submission; P = Provisional Authorisation; A = Authorisation

**Application Type:**
**Commencement date: 9/11/2022** **Risk:** Low
**Expiry date: 9/11/2023**
**Approval of the study is initially provided for a year, after which continuation of the study is dependent on receipt and review of the annual (or as otherwise stipulated) monitoring report and the concomitant issuing of a letter of continuation.**

**Special in process conditions of the research for approval (if applicable):**

•

**General conditions:**

*While this ethics approval is subject to all declarations, undertakings and agreements incorporated and signed in the application form, the following general terms and conditions will apply:*

- *The study leader/supervisor (principle investigator)/researcher must report in the prescribed format to the EMS-REC:*
  - *annually (or as otherwise requested) on the monitoring of the study, whereby a letter of continuation will be provided, and upon completion of the study; and*
  - *without any delay in case of any adverse event or incident (or any matter that interrupts sound ethical principles) during the course of the study.*
- *The approval applies strictly to the proposal as stipulated in the application form. Should any amendments to the proposal be deemed necessary during the course of the study, the study leader/researcher must apply for approval of these amendments at the EMS-REC, prior to implementation. Should there be any deviations from the study proposal without the necessary approval of such amendments, the ethics approval is immediately and automatically forfeited.*
- *Annually a number of studies may be randomly selected for an external audit.*
- *The date of approval indicates the first date that the study may be started.*

*n the interest of ethical responsibility, the NWU-SCRE and EMS-REC reserves the right to:*

1

- *request access to any information or data at any time during the course or after completion of the study;*
- *to ask further questions, seek additional information, require further modification or monitor the conduct of your research or the informed consent process;*
- *withdraw or postpone approval if:*
  - *any unethical principles or practices of the study are revealed or suspected;*
  - *it becomes apparent that any relevant information was withheld from the EMS-REC or that information has been false or misrepresented;*
  - *submission of the annual (or otherwise stipulated) monitoring report, the required amendments, or reporting of adverse events or incidents was not done in a timely manner and accurately; and / or*
  - *new institutional rules, national legislation or international conventions deem it necessary.*

The EMS-REC would like to remain at your service as scientist and researcher, and wishes you well with your study. Please do not hesitate to contact the EMS-REC or the NWU-SCRE for any further enquiries or requests for assistance.

Yours sincerely,

Mark Rathbone

Digitally signed by Mark Rathbone
DN: cn=Mark Rathbone, o=North-West University, ou=Business management, email=mark.rathbone@nwu.ac.za, c=ZA
Date: 2022.11.10 09:50:49 +02'00'

**Prof Mark Rathbone**
**Chairperson: NWU Economic and Management Sciences Research Ethics Committee**

## ADDENDUM B: LANGUAGE EDITING CERTIFICATE

The ReconNeur Co.
+27 (0) 83 453 6954
rodante.rsa@gmail.com

Language Editing Certificate

With this letter, **RD du Plessis** confirms that the document provided by **Mr. Jaco S. du Plessis,** has been checked and adapted to fall within the correct structure, language, and requirements of NWU Harvard referencing.

**The document;** *investigating the point of readiness for manufacturing SMEs to implement an Enterprise Resource Planning system,* is as stated above, and is correctly presented with NWU Harvard referencing

**Document Edit done by:**

Rodante du Plessis

**Date:**

29 November 2022