

# University of Cape Town



## Department of Information Systems

**ERP implementation success framework for developing countries: Case of  
South African SMEs.**

**A thesis submitted in partial fulfilment of the requirements for the degree  
of**

**Master of Commerce in Information System (INF5005W)**

**By**

**Gloria Irakoze**

**Supervised by Professor Lisa Seymour.**

**January 2016**

The copyright of this thesis vests in the author. No quotation from it or information derived from it is to be published without full acknowledgement of the source. The thesis is to be used for private study or non-commercial research purposes only.

Published by the University of Cape Town (UCT) in terms of the non-exclusive license granted to UCT by the author.

## Plagiarism declaration

1. I certify that I have read and understand the Commerce Faculty Ethics in Research Policy. <http://www.commerce.uct.ac.za/Pages/ComFac-Downloads>
2. I certify that I have read the General Rules and Policies Handbook (Handbook 3) regarding Student Rules of Academic Conduct: RCS1.1 to RCS3.2 and Rules Relating to examinations G20.1 to G22.2.
3. I certify that I have read and understand the document, “Avoiding Plagiarism: A Guide for students”.
4. This work has not been previously submitted in whole, or in part, for the award of any degree in this or any other university. It is my own work. Each significant contribution to, and quotation in, this dissertation from the work, or works of other people has been attributed, and has been cited and referenced.
5. I authorise the University of Cape Town to reproduce for the purpose of research either the whole or any portion of contents in any manner whatsoever.

Student number	Irkgl001	
Student name	Gloria Irakoze	
Signature of Student	<b>Signed by candidate</b>	Signature Removed
Date:	23 <sup>rd</sup> -05-2016	

I, Gloria Irakoze, , hereby declare that the work on which this thesis is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university. I authorise the University to reproduce for the purpose of research either the whole or any portion of the contents in any manner whatsoever.

Signature: **Signed by candidate** Signature Removed

Date: 23<sup>rd</sup> -05-2016

---

## Acknowledgements

First and foremost, I would like to express my gratitude to God for blessing me with an opportunity to undertake this study. Secondly, I would like to express my sincere appreciation to the following people for their invaluable contributions towards the completion of this research project:

1. My family, for all the sacrifices they have made for me to be where I am today: my mother Appolline Bakansanga in particular, for all the support, my brothers; Adelin Rwayitare, Arsene Nkurunziza and Alain Divin Bahizi.
2. My supervisor, Professor Lisa Seymour. I am very appreciative of the patience and guidance you have given me throughout this journey.
3. Mr JD van Wyk and Mr Paul Stofberg for allowing me to undertake this masters' degree while working for your company.
4. My colleagues, Ms Sharon van der Merwe and Ms Anina Theunissen for the encouragement through this journey.
5. My friends: Mr Yasser Buchana, for the invaluable advices, Miss Merciful Sundlane, Miss Josee Ufitamahoro, Miss Aline Cadette and Miss Ghislaine Ngangom for the discussions, suggestions and everything else research-related.

---

## **Abstract**

Enterprise resource planning (ERP) systems have been highlighted in literature as one of the most powerful tools in information systems to facilitate rapid decision-making, cost reduction and greater managerial control. With today's Information Technology (IT) market growth, South African Small and Medium Enterprises (SMEs) have started to recognise ERP systems as a common and necessary platform. However, literature on this topic indicates that the majority of implementations do not meet organisations' expectations. Recent research studies indicate that more than a half of ERP implementations in SMEs fail. More importantly, the factors associated with ERP implementation success in South African SMEs are largely unknown. Furthermore, the high rate failure of ERP implementation in SME represent a threat to South Africa since SMEs are the backbone of the nation's economy.

This research study therefore explores success implementation indicators and factors associated with ERP implementation in South African SMEs. In addressing the research questions, the study draws on a combination of the DeLone and McLean IS success model and the Technological, Organisational, Environmental (TOE) framework as well as a number of success factors identified through an extensive review of literature. Semi-structured interviews and thematic analysis are used to collect, analyse the data and to develop the ERP implementation success framework.

The ERP implementation success framework is composed of four Information System (IS) success indicators and thirteen success factors. Although, findings established that there are relationships between four IS success indicators and thirteen success factors, only nine of the thirteen success factors were found to have direct relationships with the IS success indicators. The nine success factors are: ERP flexibility, ERP suitability, data accuracy, timeliness, top management support, change management, project management, user training and vendor support. The IS indicators from which these nine factors are related to: Management quality, system quality, information quality and service quality.

This research contributes to the body of knowledge by suggesting a framework that can be used in guiding future ERP implementation in South African SMEs.

---

## Table of Contents

Plagiarism declaration .....	i
Acknowledgements .....	ii
Abstract .....	iii
Table of Contents .....	iv
List of Tables .....	vii
List of Figures.....	viii
Abbreviations.....	ix
Chapter 1. Introduction.....	1
1.1. Problem statement.....	1
1.2. Research aims and objectives and significance of the study .....	2
1.3. Research questions .....	3
1.4. Scope of the study .....	4
1.5. Research structure .....	4
1.6. Chapter summary .....	5
Chapter 2. Literature Review .....	6
2.1. Introduction.....	6
2.2. Definitions .....	6
2.2.1. ERP systems.....	6
2.2.2. SMEs in South Africa .....	7
2.3. ERP implementation success factors .....	8
2.3.1. Review of literature on success factors influencing the implementation of ERP systems .....	9
2.3.2. Dominant success factors of ERP implementation .....	14
2.4. Research gap.....	18
2.5. Chapter summary .....	19
Chapter 3. Research frameworks.....	20
3.1. Introduction.....	20
3.2. Technology, Organisation, and Environment context (TOE) framework .....	20
3.3. D&M IS success model.....	22
3.4. Conceptual framework .....	25
3.5. Summary of the chapter .....	27
Chapter 4. Research method .....	28
4.1. Introduction .....	28
4.2. Research philosophy.....	29

4.3.	Research approach .....	30
4.4.	Research strategy .....	31
4.4.1.	Justification of case studies selection .....	31
4.5.	Time horizon: Cross sectional .....	32
4.6.	Data Collection and analysis.....	33
4.6.1	Interviews .....	33
4.6.2.	Data analysis techniques .....	33
4.6.3.	Data analysis procedure .....	34
4.6.4.	NVIVO .....	34
4.7	Sampling technique.....	37
4.8.	Description of sample data.....	38
4.8.1.	Classification of participants by work experience.....	39
4.8.2.	Classification of participants according to their official appointment .....	40
4.8.3.	Classification of participants by gender .....	41
4.8.4.	Respondents' roles and responsibilities in ERP implementation projects .....	41
4.9.	Description of case studies.....	44
4.9.1.	Case study A .....	44
4.9.2.	Case study B .....	45
4.10.	Role of researcher and avoiding bias .....	46
4.11.	Ethical consideration .....	46
4.12.	Chapter summary .....	46
Chapter 5.	Empirical Findings and Analysis .....	48
5.1.	Introduction .....	48
5.2.	Analysis of dominant success factors and emerged relationships .....	48
5.2.1.	Technological context.....	49
5.2.2.	Organisational context.....	56
5.2.3.	Environmental context.....	64
5.3.	Analysis of IS Success indicators.....	69
5.3.1.	Management quality .....	69
5.3.2.	System quality.....	71
5.3.3.	Information quality.....	72
5.3.4.	Service quality .....	74
5.4.	Relationship framework for ERP implementation success.....	76
5.5.	Chapter summary .....	78
Chapter 6.	Conclusion .....	79
6.1.	Overview .....	79
6.2.	Back to research questions .....	79

---

6.3. Back to research aims and objectives .....	81
6.4. Contributions and direction for future research.....	82
6.5 Limitations .....	82
References .....	84
APPENDIX A: INTERVIEW QUESTIONS AND SAMPLE OF PARTICIPANTS’ RESPONSES.....	99
APPENDIX B: COVER LETTER .....	103
APPENDIX C: CONSENT FORM.....	1054
APPENDIX D: ETHICS APPROVAL LETTER.....	105

---

## List of Tables

Table 1: National Small Business Act's definition of SMEs (Falkena, 2001) .....	8
Table 2: Dominant success factors identified in developing countries in literature review published. ....	9
Table 3: Classification of factors into emerged groups .....	13
Table 4: Classification of dominant success factors .....	22
Table 5: Criteria of case study selection .....	32
Table 6: Participants' demographic details .....	38
Table 7: Participants' roles and responsibilities .....	43
Table 8: Case studies' background .....	45
Table 9: Updated dominant success factors .....	49

---

## List of Figures

Figure 1: ERP system concept (Kambarami et al., 2012).....	7
Figure 2: TOE framework (Tornatzky & Fleischer, 1990).....	21
Figure 3: D&M IS success model (DeLone & McLean, 1992) .....	23
Figure 4: Updated D&M IS success model (DeLone & McLean, 2003).....	23
Figure 5: Conceptual framework for ERP implementation success in South African SMEs..	27
Figure 6: The research Onion (Saunders, Lewis and Thornhill, 2007).....	29
Figure 7: Coverage of sources and nodes defined by the researcher .....	35
Figure 8: Nodes clustered by coding similarity .....	36
Figure 9: Participants' experience .....	39
Figure 10: Participants' official appointments .....	40
Figure 11: Participants' gender .....	41
Figure 12: Participants' groups .....	43
Figure 13: ERP suitability is a result of the amount of customisation (customisability) .....	55
Figure 14: Top management support has an effect on change management.....	57
Figure 15: User training is the result of team skills and commitment .....	60
Figure 16: Top management has an impact on user involvement through change management .....	61
Figure 17: Communication is a result of top management support.....	63
Figure 18: Change management is a result of communication .....	63
Figure 19: Vendor support has an impact on user training.....	65
Figure 20: Top management support has an effect on project management.....	67
Figure 21: Project management has an impact on team skills and commitment. ....	68
Figure 22: Customisability is affected by project management. ....	68
Figure 23: Management quality is a result of top management support.....	70
Figure 24: Change management support has an influence on management quality .....	71
Figure 25: System quality is a result of ERP flexibility .....	71
Figure 26: System quality is a result of system suitability .....	72
Figure 27: Information quality is a result of data accuracy .....	73
Figure 28: Information quality is a result of timeliness.....	74
Figure 29: Service quality is a result of vendor support.....	74
Figure 30: Project management has an effect on Service quality.....	75
Figure 31: Service quality is a result of user training.....	76
Figure 32: Final framework for ERP implementation success in South African SMEs .....	77

---

## **Abbreviations**

<b>ERP</b>	<b>Enterprise Resource Planning</b>
<b>SME</b>	<b>Small and Medium Enterprise</b>
<b>IS</b>	<b>Information Systems</b>
<b>IT</b>	<b>Information Technology</b>
<b>TOE</b>	<b>Technology, Organisation, and Environment</b>
<b>BPR</b>	<b>Business Process Reengineering</b>
<b>PPECB</b>	<b>Perishable Products Export Control</b>
<b>GDP</b>	<b>Gross Domestic Product</b>
<b>CEO</b>	<b>Chief Executive Officer</b>

---

## **Chapter 1. Introduction**

Enterprise Resource Planning (ERP) systems are complex software packages designed to integrate business processes and functions (Mutongwa & Rabah, 2011; Umble, Halft, & Umble, 2003). Notwithstanding difficulties and risks of implementing such systems, the last decade has seen a remarkable global diffusion of ERP systems (Althonayan, 2013; Zhang, Lee, Huang, Zhang, & Huang, 2005). To cope with technical developments while increasing productivity, South African Small and Medium Enterprises (SMEs) have started to implement ERP systems in both private and public organisations (Cloete, Courtney, & Fintz, 2002). Nonetheless, the successful implementation rate is low and many firms do not achieve intended goals (Scholtz, & Atukwase, 2016).

This research investigates the literature published on Information System (IS) indicators and dominant success factors of ERP implementation projects in developing countries such as South Africa. The identified success factors are then validated through analysis of findings collected from two qualitative case studies. Furthermore, this study proposes a framework detailing relationships between dominant success factors of ERP implementation in South African SMEs. To achieve this, the proposed framework combines the validated dominant success factors and two models, namely: (1) IS success model by DeLone and McLean (2003) and (2) the technology-organisation-environment (TOE) by Tornatzky and Fleischer (1990). This study finally concludes by suggesting recommendations, implications and limitations. The next section presents the problem statement of this study.

### **1.1. Problem statement**

Despite the promises and the continued popularity of ERP systems, evidence is accumulating to demonstrate that implementation success is not as straightforward as those selling and promoting such systems would like organisations to believe (Christofi, Nunes, Chao Peng, & Lin, 2013; Yusuf & Abthorpe, 2005). Since ERP systems affect various aspects of the organisational operations, their success is critical to organisational performance and survival (Al Rashid, 2012, Grabski, Leech, & Lu, 2001). Large Information Technology (IT) projects such as ERP implementations have more chance of failing than most people expect (Ahmad & Cuenca, 2013; Ziemba & Oblak, 2013).

---

Griffith, Zammuto, and Aiman-Smith (1999) claim that three-quarters of ERP implementation projects are judged to be unsuccessful. With limited technical expertise, SMEs potentially face more challenges (Dlodlo, 2011; Odhiambo, 2010).

South African organisations spend millions of rand every year to three-quarters of ERP implementation projects are judged to be unsuccessful (Van Schalkwyk & Lotriet, 2011). Regrettably, many organisations have experienced significant troubles and consequences. Since SMEs contribute on average 66.4% of total formal employment (Mutongwa & Rabah, 2011), this represents a noteworthy concern to South Africa, because SMEs play a major role for economic development of the economy (Dlodlo, 2011). The next section explains broadly the aims of this study.

## **1.2. Research aims and objectives and significance of the study**

ERP implementations continue to be laden with complications. Over the years, literature has reported that many organisations encounter disruption of regular operations and significant financial damage due to partial or total abandonment of ERP implementation projects (Chetcuti, 2008). In an attempt to overcome these problems, several researchers have tried to identify success factors influencing ERP implementations (Heeks & Hawari, 2010; Umble et al., 2003). Although most of the studies were done in developing countries (Finger, 2005; Mushavhanamadi & Mbohwa, 2013), only a few have empirically validated and discussed relationships among success factors that drive successful ERP implementation in South African SMEs (Dlodlo, 2011; Mukwasi & Seymour, 2012). The paucity of research on ERP success factors and their relationship with IS success indicators in the South African context is the motivation for this study.

The main aim of this study is to present guidelines for ERP implementation success. To accomplish this, this study initially uses a conceptual framework which categorises dominant success factors into their relevant TOE contexts. The resultant framework can be used as a tool to help organisational decision makers and implementers to enhance success of their ERP implementation projects.

To address the above mentioned aim, the following objectives are defined:

- 
1. To investigate the dominant factors influencing implementation of ERP success in South African SMEs.
  2. To propose a conceptual model for ERP implementation success in South African SMEs, using DeLone and McLean's IS success model (2003) and Tornatzky and Fleischer's framework (1990).
  3. To validate and extend the conceptual model proposed by the study.

In order to accomplish all the above-mentioned objectives, the next section presents research questions which will be answered by this study.

### **1.3. Research questions**

ERP implementation projects differ in many ways from other Information Systems (IS) projects. This is due to its comprehensiveness from the organisational point of view (Bhagwani, 2009). This study wishes to provide concrete conclusions and recommendations from the perspective of dominant success factors influencing ERP implementation success in South African SMEs. The main question addressed in this research is:

- 1) What are the dominant success factors influencing ERP implementation in South African SMEs?

The main research question is further broken down into two sub-questions:

- 2) What are the IS success indicators within South African SMEs?
- 3) What dominant success factors have direct relationships with IS success indicators?

The next section presents the scope of the study.

---

## 1.4. Scope of the study

The scope of this study is to focus on medium enterprises which fall into the formal definition and classification proposed by the South African government. The criteria for being a medium enterprise are: the number of employees and total registered capital. A medium enterprise ought to have between 51 and 200 employees and an annual registered turnover of between four and fifty million rand (Falkena, 2001). This selectivity provided a chance to effectively collect empirical data.

## 1.5. Research structure

This section presents the structure of the six chapters which constitute this study.

**Chapter 1** presents the introduction of the study.

**Chapter 2** provides a review of literature in the main two research areas with which this research touches: ERP systems and SMEs. South African SMEs are identified as interesting cases relevant to this research and dominant success factors in ERP implementation are identified accordingly.

**Chapter 3** introduces models which are used to form the conceptual framework.

**Chapter 4** forms the methodological basis of this research by identifying the interpretive paradigm while justifying the choice of this particular research philosophy, as inspired by Yin's (2009) case study approach. This chapter also explains the sources used in this research by emphasising on the reasons for choosing qualitative data-gathering techniques.

**Chapter 5** presents the analysis of findings and provides the final research theoretical framework after the validation of the identified dominant success factors.

**Chapter 6** discusses conclusions from this study's findings by explaining how the research questions are answered and how research goals are achieved. Lastly, research contribution, implications and limitations are provided.

---

## **1.6. Chapter summary**

This chapter introduced the field of interest and highlighted the aspects most closely related to the specific research area. While the problem statement that this study wishes to address is explained in section one, section two presents aims and objectives. The research questions of the study are described in section three and the scope of the study is presented in section four. Finally, the research structure and summary are provided in sections five and six respectively.

---

## **Chapter 2. Literature Review**

### **2.1. Introduction**

This chapter provides the review of relevant literature published by academics and practitioners on the most important concept of this study, i.e. dominant success factors influencing ERP implementation. This study takes a closer look at ERP implementation success factors in South African SMEs. Databases such as ACM Digital Library, Emerald insight, IEEE Explore, Google scholar, EBSCO Host, and Science direct were consulted to find leading journals and to identify relevant literature for this study.

This chapter is structured as follows:

1. **Section (2.2)** defines the two most important terms used in this study.
2. **Section (2.3)** provides the review of literature on dominant success factors which significantly influence ERP implementation success.
3. **Section (2.4)** explains the gap that this study intends to cover.
4. **Section (2.5)** presents the summary of the chapter.

### **2.2. Definitions**

This section provides the definition of what constitutes Enterprise Resource Planning (ERP) systems and the description of how Small to Medium-Sized Enterprises (SMEs) are defined in the South African context.

#### **2.2.1. ERP systems**

Many definitions have been coined with the attempt to define ERP systems (Huang & Palvia, 2001). The most commonly known definition is: ERP is a single software package which provides unified business functions by integrating organisations' core processes (Heeks & Hawari, 2010). ERP has expanded from simply coordinating manufacturing processes to being the integrator of enterprise-wide back-end processes (Kambarami, Mhlanga, & Chikowore, 2012). ERP provides an enterprise view of the business that encompasses all functions and

departments; where all business transactions are entered, recorded, processed, monitored, and reported (Bhagwani, 2009). An ERP system has a modular design which facilitates information sharing through the use of a single central database (Kale, Banwait, & Laroiya, 2009). Figure 1 illustrates what constitutes an ERP system.

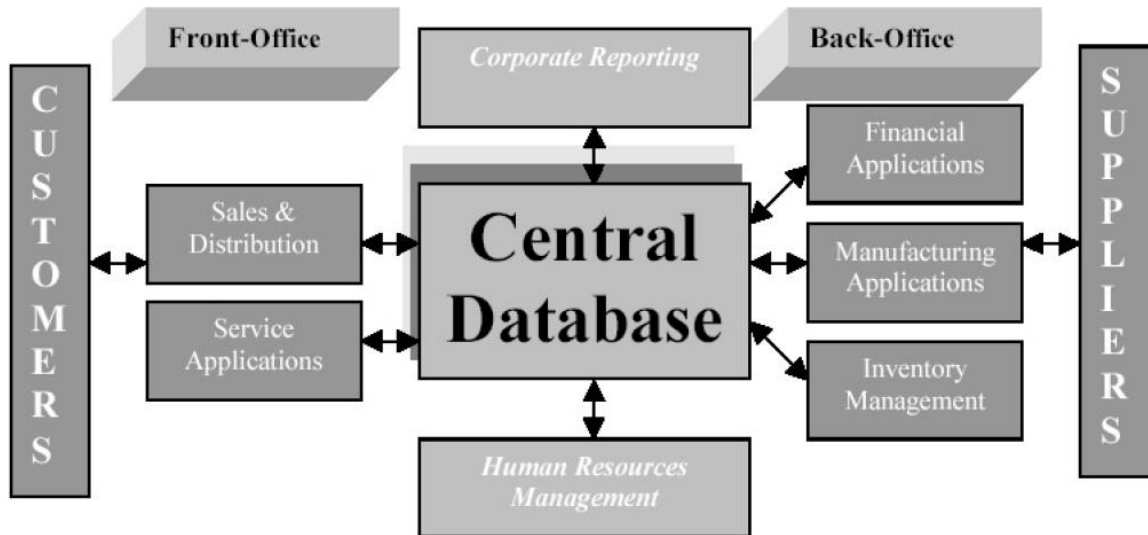


Figure 1: ERP system concept (Kambarami et al., 2012)

### 2.2.2. SMEs in South Africa

SMEs are a very large heterogeneous group of businesses operating in the service, trade, agriculture, and manufacturing sectors (Snider, da Silveira, & Balakrishnan, 2009; Ter Chian, 2010). The definition of what comprises small and medium enterprises in South Africa is still ambiguous as it encompasses a broad range of definitions (Gibson & Van der Vaart, 2008). According to Falkena (2001), SMEs can be categorised according to any of the following components: (1) the number of employees, (2) size, (3) turnover, or (4) value sales (Abor & Quartey, 2010). Table 1 describes the four categories of SMEs.

Table 1: National Small Business Act's definition of SMEs (Falkena, 2001)

<b>Enterprise size</b>	<b>Number of employees</b>	<b>Annual turnover (in South African rand)</b>	<b>Gross assets excluding fixed property</b>
<b>Medium</b>	Fewer than 100 to 200 depending on industry	Less than R4 million to R50 million depending on industry	Less than R2 million to R18 million, depending on industry
<b>Small</b>	Fewer than 50	Less than R2 million to R25 million depending on industry	Less than R2 million to R4.5 million depending on the industry
<b>Very small</b>	Fewer than 10 to 20 depending on industry	Less than R200 000 to R500 000 depending on industry	Less than R150 000 to R500 000 depending on industry
<b>Micro</b>	Fewer than 5	Less than R150 000	Less than R100 000

According to Abor and Quartey (2010), SMEs occupy 91% of the formal business entities. South African SMEs contribute over 60 % to national Gross Domestic Product (GDP) while providing over 70 % of employment (Fida, 2008). Since SMEs play an important role in alleviating poverty through the production of jobs (Abor & Quartey, 2010), entities such as the government, local, and foreign investors have pledged their support in a number of ways to develop this sector. Aid and funding are provided to develop SMEs by introducing new technologies. One such technological advancement in this field is the implementation of ERP systems (Kale, Banwait, & Laroia, 2009).

### **2.3. ERP implementation success factors**

Since over three decades ago, dominant success factors have been claimed to be useful because they help consultants and implementers plan their strategies (Esteves & Pastor, 2001; Rockart, 1979). Dominant success factors are defined as “factors which, if addressed correctly, can significantly improve project implementation success” (Esteves & Pastor, 2000; Rockart, 1979). The following section provides a review of literature on dominant success factors found in developing countries.

### 2.3.1. Review of literature on success factors influencing the implementation of ERP systems

ERP implementation is complex and risky due to large capabilities and the essential solutions expected from it. ERP systems engage a considerable number of enterprise resources, which are put at risk during implementation (Sanchez, Garcia, & Perez-Bernal, 2007). Unfortunately, the organisations do not have clear and useful guidelines to direct, effectively and efficiently, the process of implementing an ERP system. Consequently, researchers have been continually attempting to find suitable approaches which influence ERP implementation success (Mutongwa & Rabah, 2011). For example, Moohebat and Davarpanah (2010) conducted an empirical review on 400 articles in 183 countries to identify dominant success factors of ERP implementation. Throughout their study, Moohebat et al. (2010), suggested that dominant success factors in developed and developing countries are similar except for the national culture. This was contradicted by Rajapakse and Seddon (2005) who claimed that not only national culture differentiates dominant success factors in developed and developing countries, but also high cost, lack of knowledge, and lack of integration. The difference of opinions on ERP success factors has led the researcher to conduct a review of literature to identify most dominant success factors which apply to developing countries, especially South Africa. Through a careful review of twenty papers, thirty-two dominant factors were identified by the researcher. As illustrated in Table 2, the dominant success factors column represents the factors found in literature; the authors' column represents researchers who cited the dominant factors, and the count column represents the number of papers in which a factor was cited.

*Table 2: Dominant success factors identified in developing countries in literature review published.*

<b>Dominant success factors</b>	<b>Authors</b>	<b>Count</b>
Top management support	(Ahmed & Khan, 2013), (Averweg & Erwin, 2000), (Brink, Roos, Weller, & Van Belle, 2006), (Dawson & Van Belle, 2013), (De Jager, 2010), (Dlodlo, 2011), (Joubert, 2002), (Hart, 2010), (Kalema, Olugbara, &	<b>14</b>

	Kekwaletswe, 2014), (O'Donovan, Seymour, Geldenhuys, Isaacs, & Kaulule, 2010), (Ramburn, Seymour, & Gopaul, 2014), (Van Schalkwyk & Lotriet, 2011), (Shah, Khan, Abdul, Bokhari, & Raza, 2011), (Singh & Wesson, 2009).	
Change management	(Ahmed & Khan, 2013), (De Jager, 2010), (Dlodlo, 2011), (Joubert, 2002), (Hart, 2010), (Kalema et al., 2014), (Gibson, 2012), (O'Donovan et al., 2010), (Ramburn et al., 2014), (Ramburn & Seymour, 2014), (Van Schalkwyk & Lotriet, 2011), (Singh & Wesson, 2009), (Smuts, Van der Merwe, Looek, & Kotze, 2010).	<b>13</b>
User training	(Averweg & Erwin, 2000), (Brink et al., 2006), (De Jager, 2010), (Dlodlo, 2011), (Hart, 2010), (Kalema et al., 2014), (Joubert, 2002), (Gibson, 2012), (O'Donovan et al., 2010), (Ramburn et al., 2014), (Singh & Wesson, 2009).	<b>11</b>
Project management	(Dawson & Van Belle, 2013), (De Jager, 2010), (Dlodlo, 2011), (Hart, 2010), (Joubert, 2002), (Kalema et al., 2014), (Gibson, 2012), (Shah et al., 2011), (Singh & Wesson, 2009), (Smuts et al., 2010).	<b>10</b>
Business re-engineering	(Dlodlo, 2011), (Finger, 2005), (Hart, 2010), (Joubert, 2002), (De Jager, 2010), (Kalema et al., 2014), (O'Donovan et al., 2010), (Shah et al., 2011), (Singh & Wesson, 2009), (Smuts et al., 2010).	<b>9</b>
Communication	(Brink et al., 2006), (De Jager, 2010), (Dlodlo, 2011), (Smuts et al., 2010), (Finger, 2005), (Hart, 2010), (Joubert, 2002), (Kalema et al., 2014), (Gibson, 2012).	<b>8</b>
User involvement	(Ahmed & Khan, 2013), (Averweg & Erwin, 2000), (Dawson & Van Belle, 2013), (Dlodlo, 2011), (Kalema et al., 2014), (Van Schalkwyk & Lotriet, 2011), (Shah et al., 2011).	<b>7</b>

Vendor support	(Ahmed & Khan, 2013), (Brink et al., 2006), (Finger, 2005), (Kalema et al., 2014), (Ramburn & Seymour, 2014), (Shah et al., 2011), (Smuts et al., 2010).	7
Implementations resources	(Brink et al., 2006), (Kalema et al., 2014), (Gibson, 2012), (Singh & Wesson, 2009), (Kalema et al., 2014), (O'Donovan et al., 2010).	6
Team skills and commitment	(Ahmed & Khan, 2013), (De Jager, 2010), (Dlodlo, 2011), (Hart, 2010), (Joubert, 2002), (Smuts et al., 2010).	6
Data accuracy	(Dawson & Van Belle, 2013), (Finger, 2005), (Kalema et al., 2014), (Gibson, 2012), (Marshall & Taylor, 2014).	5
ERP suitability	(Averweg & Erwin, 2000), (Kalema et al., 2014), (Gibson, 2012), (Marshall & Taylor, 2014), (Singh & Wesson, 2009).	5
Trust	(Dlodlo, 2011), (Finger, 2005), (Hart, 2010), (Kalema et al., 2014), (Singh & Wesson, 2009).	5
System quality	(Ahmed & Khan, 2013), (Dawson & Van Belle, 2013), (Finger, 2005), (Singh & Wesson, 2009), (Smuts et al., 2010).	5
Development, troubleshooting and testing	(Brink et al., 2006), (De Jager, 2010), (Hart, 2010), (Kalema et al., 2014).	4
Business plan and vision	(Dawson & Van Belle, 2013), (De Jager, 2010), (Hart, 2010), (Kalema et al., 2014).	4
Goal realisation	(Averweg & Erwin, 2000), (Joubert, 2002), (Kalema et al., 2014), (Singh & Wesson, 2009).	4
Project champion	(Joubert, 2002), (Kalema et al., 2014), (Singh & Wesson, 2009), (Finger, 2005).	4
Relative use	(Averweg & Erwin, 2000), (Kalema et al., 2014), (Singh & Wesson, 2009).	4
User satisfaction	(Averweg & Erwin, 2000), (Kalema et al., 2014), (Marshall & Taylor, 2014), (De Jager, 2010).	4

Customisability	(Hart, 2010), (Kalema et al., 2014), (Gibson, 2012).	<b>3</b>
Legacy systems management	(Hart, 2010), (Kalema et al., 2014), (Singh & Wesson, 2009).	<b>3</b>
Organisational culture	(De Jager, 2010), (Joubert, 2002), (Kalema et al., 2014).	<b>3</b>
Performance evaluation	(Hart, 2010), (Kalema et al., 2014), (Gibson, 2012).	<b>3</b>
Technological infrastructure	(Dlodlo, 2011), (Hart, 2010), (Kalema et al., 2014).	<b>3</b>
Use of consultants	(Dlodlo, 2011), (Kalema et al., 2014), (Singh & Wesson, 2009).	<b>3</b>
Enterprise-wide implementation	(Dlodlo, 2011), (Singh & Wesson, 2009).	<b>2</b>
Funds	(Kalema et al., 2014), (Gibson, 2012).	<b>2</b>
Knowledge management	(Ahmed & Khan, 2013), (Ramburn & Seymour, 2014).	<b>2</b>
Software configuration	(Kalema et al., 2014), (Gibson, 2012).	<b>2</b>
Appropriate business and legacy systems management	(De Jager, 2010).	<b>1</b>
Clearly defined scope	(Gibson, 2012).	<b>1</b>
Information source	(Averweg & Erwin, 2000).	<b>1</b>

In order to avoid redundancy while ensuring that data extracted from literature was simplified, the thirty-two success factors mentioned above were consolidated into fourteen factors. The next section explains the approach that was employed to ascertain the most relevant fourteen factors.

### 2.3.1.1. *Thematic analysis and classification of most relevant dominant success factors*

This study followed thematic analysis to ensure that dominant success factors didn't repeat themselves. Thematic analysis technique allows two or more codes to collapse into each other in order to form one code (Braun & Clarke, 2006). Through the code review, some factors were grouped to guarantee that the factors with related meaning were emerged into a factor. Table 3 presents the most relevant fourteen dominant success factors.

*Table 3: Classification of factors into emerged groups*

<b>Dominant Success factors</b>	<b>Emerged group factors</b>	<b>Count</b>
Top management support	Project champion, goal realisation, Business plan and vision	14
Change management	Organisational culture	13
User training	knowledge management	11
Project management	Clearly defined scope	10
Business process re-engineering	Enterprise-wide implementation, Appropriate business and legacy systems management	9
Communication		8
User involvement	User satisfaction	7
Vendor support	Use of consultants	7
Team skills and commitment	Performance evaluation, Development, Troubleshooting and testing	6
ERP flexibility	Relative use	6
Implementations resources	Funds, Technological infrastructure	6
Customisability	Software configuration	6
ERP suitability	System quality	6
Data accuracy	Information source	5

The next section provided the description of the fourteen most relevant dominant success factors.

---

### **2.3.2. Dominant success factors of ERP implementation**

#### ***i. Top management support***

ERP implementation success is significantly influenced by top management support because top managers are responsible for determining, clarifying, and communicating a consistent message of support for the initiative (Singh & Wesson, 2009). According to Kambarami et al. (2012), top managers may avoid ERP implementation failure by having a shared vision of the organisation, as well as defining the role of the new system and structures. De Jager (2010) adds that it is important for top managers to allow a mindset of change by accepting that a lot of learning is to be done at all levels, including in themselves. With 14 paper citations in papers review and two emerged group factors (project champion and goal realisation), top management support is considered as one of the dominant factors for ERP implementation success.

#### ***ii. Change management***

Change management is referred to as the capability to anticipate change which may happen in the future in order to effectively manage it (Kalema, Olugbara, & Kekwaletswe, 2014). Numerous authors stress the importance of change management as it helps organisations to address problems such as resistance to change by encouraging users to understand and own the system (Odhiambo, 2010; Singh & Wesson, 2009; Smuts, Van der Merwe, Loock, & Kotze, 2010). Change management was classified as the dominant factor because it was cited in thirteen papers and one emerged group factor – namely, organisation culture.

#### ***iii. User training***

According to Hanning (2010), ERP implementation is greatly affected by the adequacy of training provided to users. To ensure ERP implementation success, organisations are required to invest in developing the human capacity (Kalema et al., 2014; O'Donovan, Seymour, Geldenhuys, Isaacs, & Kaulule, 2010). Extensive user training on ERP tools is needed and the options such as prototypes of the system are important to ensure that users understand the functionalities (Dlodlo, 2011; Hart, 2010). This study's review has shown that user training

---

was cited in eleven papers and one emerged group factor – namely, knowledge management. Due to this, user training was eligible to be classified as a dominant factor in ERP implementation.

***iv. Project management***

Project managers are responsible for helping the ERP implementation project to follow a strategic plan while integrating different aspects of the organisation (Dawson & Van Belle, 2013; Hart, 2010). Strong project management skills are required for organisations, since ERP implementation projects are inherently complex (Sedera & Dey, 2006). In this study's review, project management was cited in ten papers and was comprised of two emerged group factors – clearly defined scope, and business plan and vision. This allowed project management to be considered as a dominant success factor in ERP implementation.

***v. Business Process Reengineering (BPR)***

Organisations have different ways of conducting business processes. It is important that ERP implementation process consider appropriate ERP implementation tactics to allow alignment between business processes and the ERP business model (Bhagwani, 2009, Kalema et al., 2014). Organisational managers are in charge of deciding whether business process reengineering can be performed before, during or after ERP implementation (Esteves & Pastor, 2000). BPR was seen as a dominant success factor because it was cited in ten papers through the review of literature.

***vi. Communication***

Communication is one of most challenging and difficult tasks in any ERP implementation project (Smuts et al., 2010). According to Dlodlo (2011), the communication process should start early and should clarify the reasons for implementing the ERP. Additionally, communication should not only just exist between senior management and project team members, but the whole organisation should be aware of the project scope, its objectives, and its activities (Dezdar & Ainin, 2011; Joubert, 2002). This allows gaining approval and user

---

acceptance. Communication was mentioned in eight papers through the review of literature which allowed the researcher to count it as a dominant success factor for ERP implementation.

**vii. *User involvement***

User involvement is a process by which users are enabled to become actively and genuinely involved in defining the issues of concern or making decisions through the ERP implementation process (Shah, Khan, Abdul, Bokhari & Raza, 2011). Since staff members are dominantly involved in the project, they are most often affected directly by the change. Therefore, a key strategy to manage staff is to engage them early on and continuously throughout the project (Chetcuti, 2008). User involvement was referred to as a dominant success factor because it was mentioned in seven papers and had one emerged group – namely, user satisfaction.

**viii. *Vendor support***

Due to the complexity of ERP systems, most SMEs use external vendors to implement ERP systems (Shah et al., 2011). Since vendor consultants are involved in different stages of the ERP implementation, it is crucial that they possess good interpersonal skills in order to work with people (Smuts et al., 2010). The vendor/implementer is required to offer the client all information related to the system, as well as to honestly explain strength and weakness of the system. Clearly, vendor support is an important dominant factor and has to be managed and monitored very carefully (Brink et al., 2006). To be included amongst the dominant success factors, ERP vendor consultant support was mentioned by six papers and had one emerged group factor – namely, use of consultants.

**ix. *Team skills and commitment***

Every organisation needs staff members who are dedicated and care about the mission (Ahmed & Khan, 2013). Teamwork can be built when working on a project. However, starting with people who generally like each other and work well across functions can help make a significant change (Chetcuti, 2008). To be qualified as a dominant success factor, team skills

---

and commitment was mentioned in six papers and two emerged group factors – namely, performance evaluation development and trouble shooting and testing.

***x. ERP flexibility***

ERP flexibility is referred to as the degree with which the system can cater for change which can inevitably arrive in the future (Singh & Wesson, 2009). Ahmed and Khan (2013) add that ERP flexibility is mainly presented by the ability that the system offers the users in order to adapt to possible or future changes in its requirements. Due to fast growth of markets, it is important that flexibility is achieved by ERP to accommodate change. ERP flexibility has been classified as a dominant factor as it was mentioned in six papers in the review of literature and has one emerged group factor – namely, relative use.

***xi. Implementation resources***

Implementation resources refer to either resources or assets which allow the organisation to perform certain actions (Kalema et al., 2014). These are related to all dominant success factors comprising funds or infrastructure used in the implementation process. Since this study is focusing on ERP implementation in developing countries, the financial motivational factors are highlighted as an important success factor. This factor was included amongst dominant factors as it was cited in six papers and had two emerged group factors – funds and technological infrastructure.

***xii. Customisability***

Organisations have different ways of conducting business processes. It is important that the ERP implementation process consider the amount of customisation to allow alignment between business processes and the ERP business model. This process allows improvement of the software functionality according to the organisation's needs (Esteves & Pastor, 2000). Since over-customisation can cost unnecessary resources to both the organisation and the vendor, it is essential that both parties agree on the amount of system configuration to be performed (Chen, Chen, & Tsai, 2009).

---

***xiii. ERP suitability***

Numerous organisations operating in developing countries prefer to buy systems in order to shorten the implementation cycle, as well as to avoid in-house ERP development (Averweg & Erwin, 2000). Since, each organisation's business processes are unique, it is reported that numerous ERP systems fail to achieve suitability (Marshall & Taylor, 2014). Hence, it is crucial for management to ensure that the ERP is suitable to align with the organisational business processes prior to the implementation process, in order to increase chances of ERP success (Marshall & Taylor, 2014). ERP suitability was classified as a dominant success factor since it was cited by six papers and had one emerged group factor – namely, system quality.

***xiv. Data accuracy***

Since ERP system modules are linked to one another, inaccurate data input into one module adversely affects other modules (Kalema et al., 2014). Thus, data accuracy is a major determinant of ERP success (Dawson & Van Belle, 2013). Data accuracy was included amongst dominant success factors as it was mentioned in five papers and had one emerged group factor – namely, information source.

The next section explains the gap this study intends to cover.

## **2.4. Research gap**

Recent research has indicated that more than a half of ERP implementation performed in SMEs fails to realise intended benefits (Mukwasi & Seymour, 2012). This failure has been known to lead to problems as serious as organisational bankruptcy (Bulkelery, 1996; Davenport, 1998). The literature review shown in this chapter highlights continuous failure of ERP implementation in SMEs. SMEs play an important role on the South African economy since they contribute more than 50% of employment within South Africa (Mutongwa & Rabah, 2011). With this in mind, it is vital that ERP implementations in South African SMEs are successful.

---

Contrary to developed countries, little research has been conducted on ERP implementation success in South Africa (Mushavhanamadi & Mbohwa, 2013), and in Africa in general (Dlodlo, 2011). It is therefore essential that this study identify dominant success factors influencing ERP implementation success in South African SMEs. These factors affect the ERP implementation projects as they are responsible for shaping the implementation outcome. The gap was fulfilled by identifying fourteen dominant success factors from the review of literature. These factors will be used to formulate a conceptual framework which will guide ERP implementers.

## **2.5. Chapter summary**

In order to advance the field of ERP, the study gave appropriate attention to ERP implementation in South African SMEs. This chapter mostly focused on the factors which influence ERP implementation success, while the second section provided the definitions and description of what constitutes an ERP system and SMEs in the South African context. Through the number count by which each factor was cited in papers, the third section provided a depth review of literature to identify the fourteen most relevant dominant ERP success factors. Factors identified are: top management support, change management, user training, project management, business process reengineering, communication, user involvement, vendor support, team skills and commitment, ERP flexibility, implementation resources, trust, ERP suitability and data accuracy. The research gap was then highlighted in the fourth section and, finally, the chapter summary was presented in section five.

The next chapter presents the research frameworks used as a lens to guide this study.

---

## Chapter 3. Research frameworks

### 3.1. Introduction

Several IS researchers are interested in studying models, theories and frameworks that have the ability to forecast and explain behaviour through different IS domains (DeLone & McLean, 2003; Tornatzky & Fleisher, 1990). It is anticipated that the theoretical concepts derived from these IS theories can help provide a firm foundation for the research model that would appropriately provide factors influencing ERP implementation success in South African SMEs. This would in turn address the first research objective (refer to Chapter 1). From this perspective, this chapter looks at the two widely studied frameworks in information systems literature. This chapter presents the background of the two models. These two models were selected because they are closely connected to the requirements of this study. The conceptual theoretical model is therefore formed through these models to answer the second objective of this study (refer to chapter 1).

Sections presented in this chapter were structured as follows:

1. **Section 3.2** explains the concept behind the Technology, Organisation, and Environment model (TOE).
2. **Section 3.3** presents the DeLone and McLean IS success model.
3. **Section 3.4** presents the conceptual model.
4. **Section 3.5** provides the chapter summary.

### 3.2. Technology, Organisation, and Environment context (TOE) framework

According to Odhiambo (2010), there is a strong need to understand the contextual setting of developing countries in order to effectively implement an ERP system. ERP implementation success is greatly influenced by the state of the organisation in its environment (Angeles, 2013). The Technology-Organisation-Environment (TOE) framework was introduced by Tornatzky and Fleischer (1990). TOE's fundamental aim is to study circumstances which surround an organisation (Zhu & Kraemer, 2005). The TOE framework is comprised of three elements, namely: technological context, organisational context and environmental context.

Technological context includes both existing and new technologies in use and relevant to the organisation (Angeles, 2013), Organisational context suggests measures of the organisation such as size, scope, and the amount of resources available internally (Zhu & Kraemer, 2005). The third element, environmental context, is referred to as the arena where the organisation operates. This includes the industry, competitors, and the government (Angeles, 2013). Figure 2 illustrates the three contexts which form the TOE model:

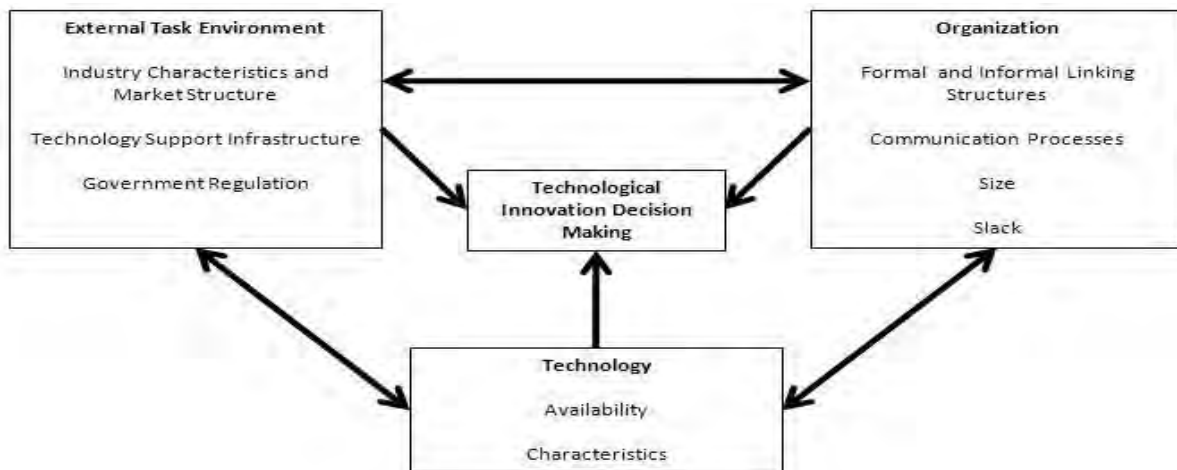


Figure 2: TOE framework (Tornatzky & Fleischer, 1990)

As Abdalla (2012) suggests, ERP implementation success factors can be assessed through the afore-mentioned three contextual aspects of the TOE model. Thus, the researcher categorised the fourteen dominant success factors according to the three relevant TOE contexts, as shown in Table 4. Dominant factors were grouped into contexts, depending on the nature of each context. For example, technological context is comprised of success factors which are directly related to the system use and performance. The organisational context is constituted of success factors which are directly related to the organisation's operations and governance, while the environmental factor is comprised of success factors from the external environment.

Table 4: Classification of dominant success factors

<b>Contexts</b>	<b>Dominant success factors</b>
<b>Technological context</b>	ERP flexibility Data accuracy ERP suitability
<b>Organisational context</b>	Top management support Change management Business process reengineering Implementation resources Effective communication Education and user training User involvement Team composition and skills Trust
<b>Environmental context</b>	Vendor support Project management

### 3.3. D&M IS success model

A study done by DeLone and McLean (1992) was the first to identify indicators that contribute to IS success. A review of literature, which included 180 papers, was done in the period of 1981 to 1987 and was used to identify the six major dimensions of IS success model. The identified IS success indicators were: (1) system quality, (2) information quality, (3) user satisfaction, (4) use, (5) organisational impact, and (6) individual impact. Figure 3 illustrates the relationship between the dimensions of the DeLone and McLean (D&M) (1992) model.

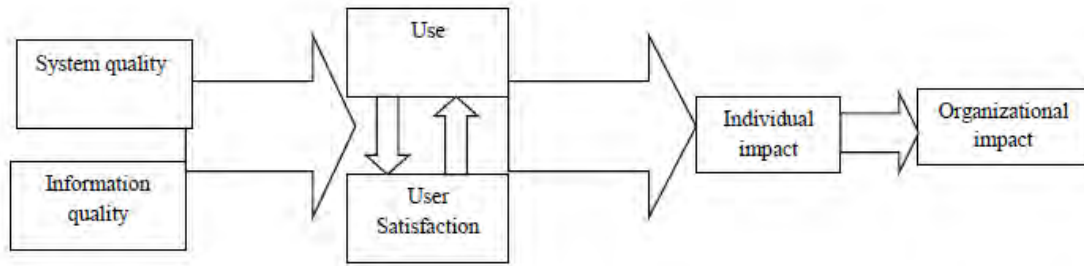


Figure 3: D&M IS success model (DeLone & McLean, 1992)

However, the study done by Sabherwal, Jeyaraj, and Chowa, (2006) declared that DeLone and McLean's (1992) model was unfit, due to the lack of empirical testing of dimensions. Hence, several researchers engaged in testing the DeLone and McLean (1992) model. For instance, a study by Seddon (1997) claimed that the DeLone and McLean (1992) model was confusing because researchers were trying to combine both the process and causal explanation of IS success. Additionally, Pitt, Watson and Kavan, (1998) argued that service quality should be one of the component of the D&M model to ensure that the IS department does not only provide products, but also a service. Due to all critics, the DeLone and McLean (2003) study did another review of literature, and service quality was deemed relevant to their model. The updated IS success model in Figure 4 was then published by Petter, and McLean, (2008) to include the following six dimensions: (1) system quality, (2) information quality, (3) service quality, (4) user satisfaction, (5) use and (6) net benefit.

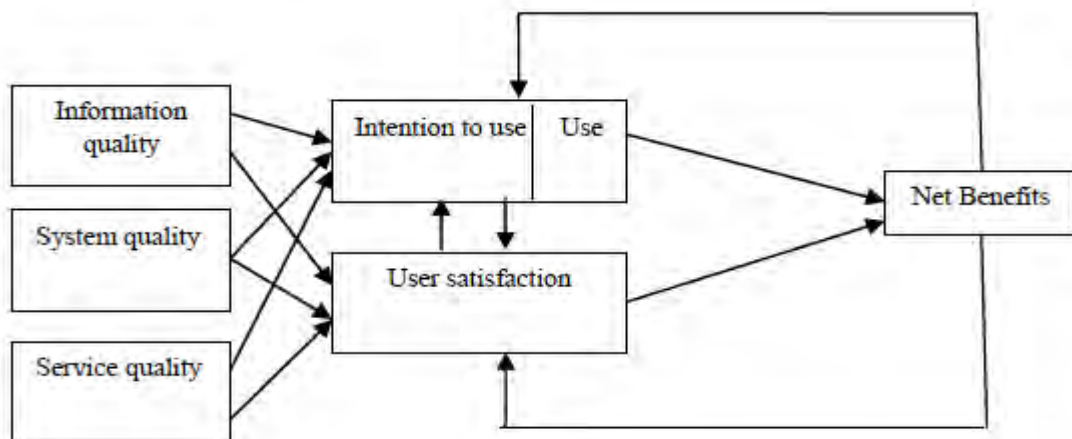


Figure 4: Updated D&M IS success model (DeLone & McLean, 2003)

---

### ***a. System quality***

System quality is referred to as the degree to which ERP performs (Bharati & Chaudhury, 2004). According to DeLone and McLean (1992), system quality is comprised of ERP characteristics which allow users to make decisions. These characteristics are: (1) system flexibility, (2) ease of use and (3) ease of learning (Petter & McLean, 2008). ERP flexibility is defined as possibilities of modifying ERP's modules in instances of occurrence of new demands (Bailey & Pearson, 1983; Bharati & Chaudhury, 2004). Ease of use is perceived as the degree to which the user can use the ERP and ease of learning is referred to as the degree to which learning the ERP is perceived to be effortless to learn by the user (DeLone & McLean, 2003).

### ***b. Information quality***

Information quality is defined as the accuracy of required information which is produced by the ERP. According to Petter and McLean (2008), information quality is used to measure user satisfaction. In instances where the quality of information is inaccurate, users get frustrated, which may lead to failure of ERP implementation (Althonayan, 2013). Information quality is comprised of five components, namely: data accuracy, timeliness, completeness, format, and relevancy of information (DeLone & McLean, 2003). Edlund, Lövquist, and Nilsson (2012) argue that accuracy is perceived as users' satisfaction from correctness of information produced by IS. Timeliness is referred to as the way users perceive how updated the information produced by the system is (DeLone & McLean, 2003). Completeness is perceived as comprehensiveness of information provided by the system (DeLone & McLean, 2003). Format and relevancy of information is perceived as the way users perceive the presentation of information given by the system (DeLone & McLean, 2003).

### ***c. Service quality***

Service quality is referred to as internal or external support which is offered by a service provider or IT department to ERP system users (Petter & McLean, 2008). Service quality is comprised of four major components, namely: reliability, empathy, responsiveness and assurance (Petter & McLean, 2008). According to Seddon (1997), reliability is an important

---

component as it indicates how users see their service provider or the IT department. While DeLone and McLean (2003) define empathy as the attention and understanding of users' need from the support unit, responsiveness is defined as the fast service and preparedness to help users, shown by the support unit. Thereafter, assurance is concerned with the users' knowledge perception from the support unit (DeLone & McLean, 2003).

*d. Use, intention to use and user satisfaction*

ERP use and user satisfaction have been recognised as one of the accurate measures for ERP systems' success. Use is a fairly complex dimension since it is comprised of many aspects (DeLone & McLean, 1992; DeLone & McLean, 2003). According to Seddon (1997), use can be described as the effort that will be consumed to use the IS. User satisfaction is, however, perceived as users' feelings and attitudes concerning aspects in which they are involved (Raymond, 1990). User satisfaction is measured according to users' response of ERP use (DeLone & McLean, 2003).

*e. Net benefits*

Net benefits allow researchers to find both positive and negative consequences of using the system, not limiting the results to whether the system is good or bad (Althonayan, 2013). The choice of how benefits should be measured depends on the purpose of the system being evaluated (Petter & McLean, 2008).

The following section presents the conceptual framework based on the D&M model, the TOE model as well as the fourteen dominant success factors identified in chapter 2.

### **3.4. Conceptual framework**

The conceptual framework produced in this chapter offers an understanding of dominant factors to be met by SMEs in order to successfully implement ERPs in the South African context. According to Abdalla (2012), dominant success factors are not enough on their own to form an informative framework. To form a suitable conceptual framework for ERP implementation success in the South African context, this study combines Tornatzky and

---

Fleischer's model (1990), D&M (2003) as well as the identified fourteen dominant ERP success factors (refer to chapter 2).

Success indicators such as 'use' and 'intention to use' have been removed from the conceptual framework because the newly implemented ERP is mandatory for use to all users (Amoako-Gyampah & Salam, 2004). This is supported by Klaus, Wingreen and Blanton (2007) who echoed that since the ERP integrates all organisational data, it would not be useful if only some departments used the system while others do not. Furthermore, success indicators such as net benefits and user satisfaction were classified as components of ERP implementation success, because they only emerge once the ERP project has been completed and has succeeded (Al Rashid, 2012).

Figure 5 depicts the conceptual framework of ERP implementation success in South African SMEs. The arrows from the TOE contexts to the IS success indicators represent relationships between dominant factors and IS success indicators, which finally lead to ERP implementation success.

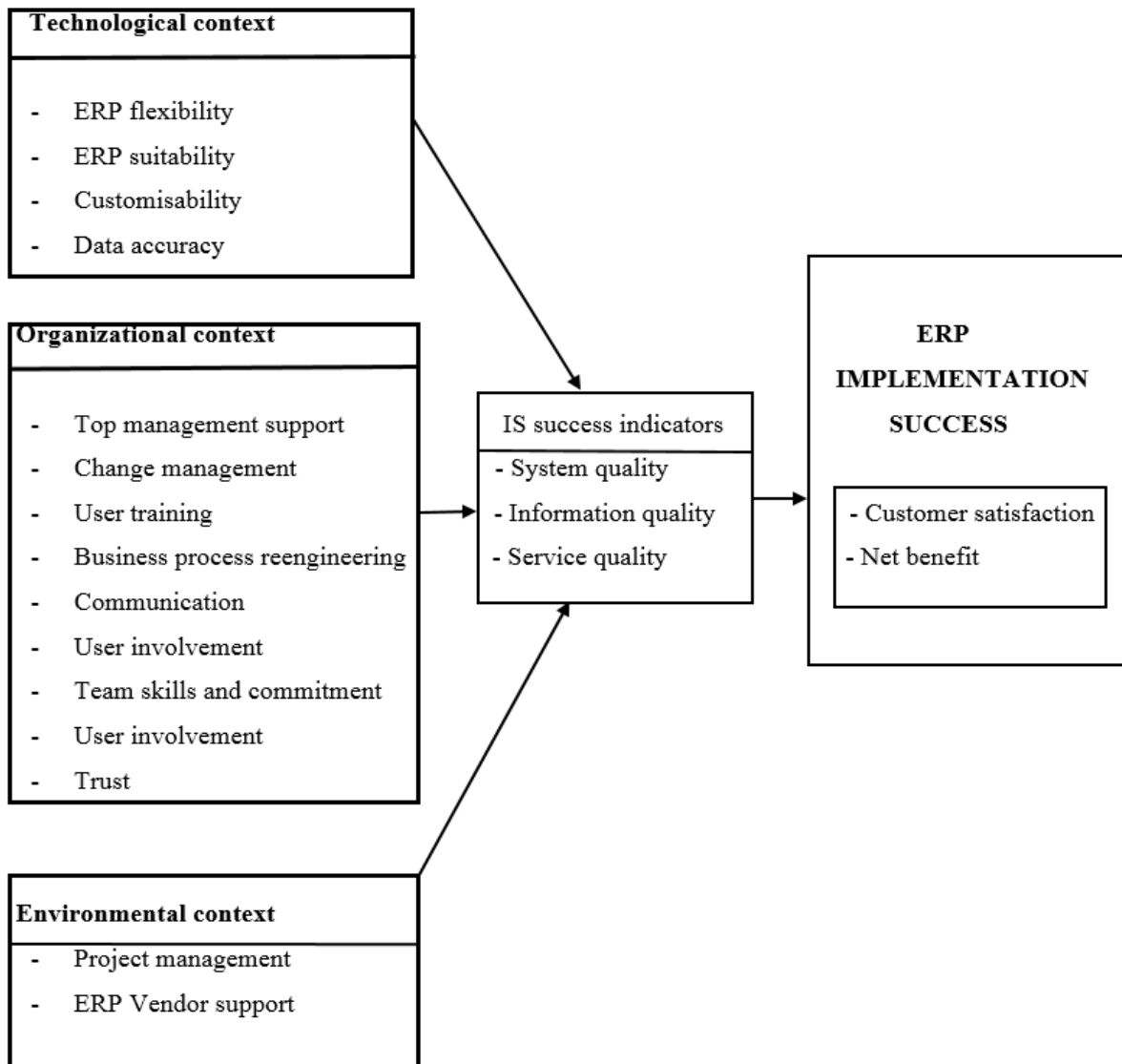


Figure 5: Conceptual framework for ERP implementation success in South African SMEs

### 3.5. Summary of the chapter

This chapter provided a comprehensive description of the two theories (DeLone and McLean IS success model (2003); Tornatzky and Fleischer's TOE framework (1990)) which are amongst the most researched topics in information systems literature. After a careful examination of each model, the extensively studied theories and models relating to IS have been used to form a conceptual framework for ERP implementation success, as illustrated in chapter four. The summary of the chapter has then been represented in section five. Having discussed the underlining concepts and models which were used as lens to guide this study, the research methodology is presented next.

---

## Chapter 4. Research method

### 4.1. Introduction

The selection of research methods is not straightforward and no single approach can fit all studies. According to Mathiassen, Conboy and Fitzgerald (2012), numerous researchers have dedicated their studies to developing different approaches, techniques and methods in the IS discipline. It is therefore important to consider a number of aspects such as the research topic, research questions and research objectives prior to choosing a research methodology (Yin, 2009). The aim of this chapter is to highlight the research design followed by this study.

Sections presented in this chapter were structured as follows:

1. **Section 4.2** provides the concept behind the research philosophy and research approach.
2. **Section 4.3** presents the research approach.
3. **Section 4.4** explains the concept behind the research strategy.
4. **Section 4.5** presents the time horizon of this study.
5. **Section 4.6** provides the data collection and analysis process.
6. **Section 4.7** provides the description of sample data.
7. **Section 4.8** describes cases studies used by the researcher to collect and analyse data.
8. **Section 4.9** explains the role of the researcher in avoiding bias.
9. **Section 4.10** presents the ethical consideration and, finally,
10. **Section 4.11** summarises the chapter.

The research methodology is defined as a framework procedure within which the study is performed (Remenyi, Williams, Money, & Swartz, 2003). There is no specific methodology available to fit all facets of knowledge required for Information System research (Galliers, 1992). This study selected the most useful methodologies according to the aspects and the type of the research problem identified (refer to chapter 1). In order to formulate an effective methodology and describe the stages which the researcher must follow, this study utilised the research ‘onion’ developed by Saunders, Lewis and Thornhill (2007). Figure 6 entails the five principles which guided this study namely: (1) research philosophy, (2) research approach, (3) research strategy, (4) time horizon and (5) data collection method.

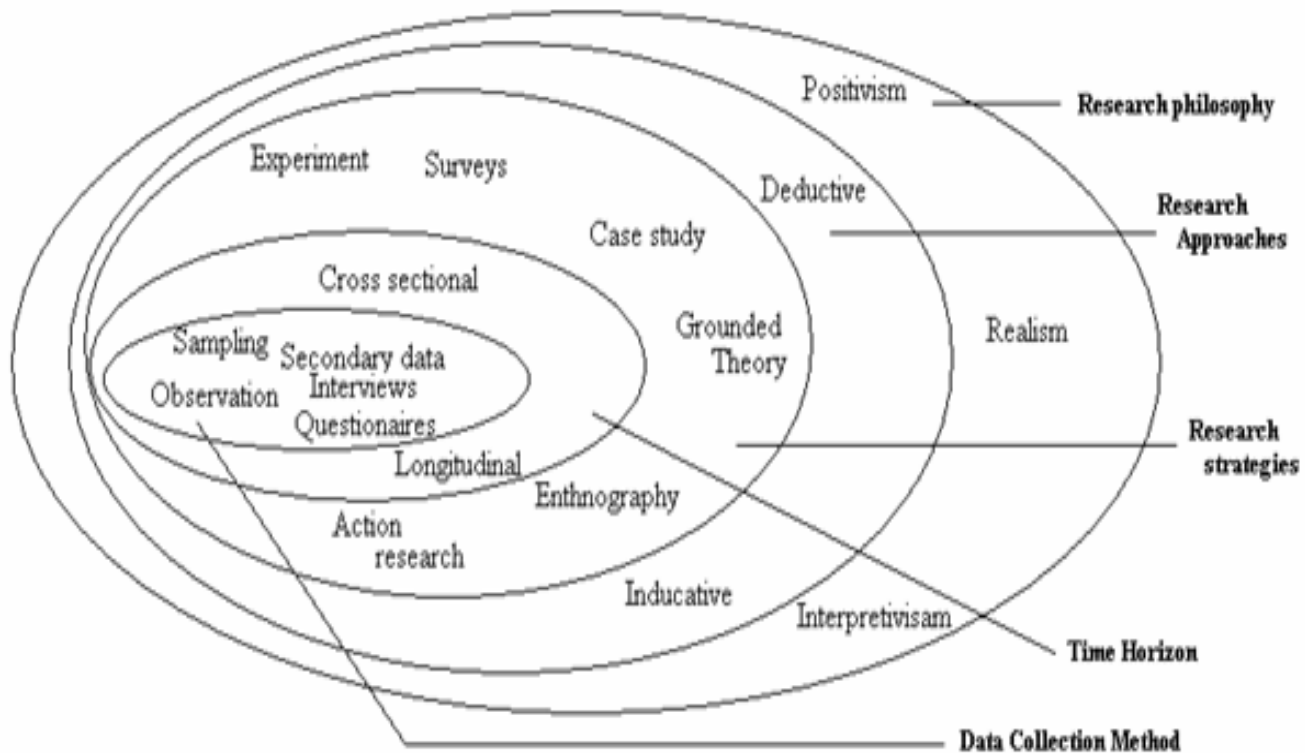


Figure 6: The research Onion (Saunders, Lewis and Thornhill, 2007).

## 4.2. Research philosophy

Philosophy of a research study is defined as basic beliefs that shape the way of thinking about the world we live in. These beliefs are classified into two categories: (1) ontology assumption and (2) epistemology assumption (Burrell & Morgan, 1979). Ontology refers to the nature of the world or reality. Epistemology is concerned with the study of knowledge and what we accept as being valid knowledge. Understanding the philosophy of the research helps to frame the research design, at the same time showing the relation between data and theory.

This study was based on an interpretive paradigm as it is shaped by social norms in the South African context, as well as subjective meanings of participants' understanding. The interpretive paradigm further helped to understand the historical and cultural settings of participants while focusing on the context in which they work. Hence, it was used to understand the opinions of people implementing ERP systems. Moreover, this study's purpose was descriptive as the researcher was studying a contemporary real-life situation, as suggested by Yin (2004). This

---

approach allowed for the development of a more holistic and integrative ERP implementation success framework. The next section explains the research approach used in this study.

### **4.3. Research approach**

As Creswell (2003) suggested, this study followed a systematic and orderly approach for data collection and analysis to ensure that valuable information was obtained from the data. This study followed a combination of a deductive approach as well as an inductive approach. The deductive approach was used because the study was concerned with first establishing general theories and a knowledge base, in order to gain specific knowledge from the research process (Saunders et al., 2007). On the other hand, an inductive approach was used because it allowed the researcher to go beyond the data, recognise new ideas, understand the concepts and link the patterns and themes which allowed development of a proposed framework (Saunders et al., 2007).

Since the main objective was to improve the understanding of a phenomenon (Kohlbacher, 2006; Merriam, 1995), this study used the qualitative research. The following points explain the researcher's choice of using qualitative data in this study.

- (1) Qualitative data type helped in understanding the ERP implementation success based on a complex and holistic picture (Creswell, 2003).
- (2) The researcher focused on organisations which fall in the medium category. Thus, the qualitative data allowed the researcher to derive deeper understanding of the organisations' practices and implementation success factors.
- (3) Due to complexity of the ERP implementation process, the researcher used qualitative data to allow profound investigation and richness of empirical data.
- (4) The experimental or mathematical operation could not fill the gap of objectives and aims of this study.
- (5) Finally, qualitative data shaped the holistic view of the research problem that this research was trying to answer.

The following section describes the research strategy.

---

## 4.4. Research strategy

This study conducted the case study strategy. Case study is defined as a research strategy which focuses on understanding the dynamics presented within a single setting or multiple settings (Eisenhardt, 1989). It attempts to learn about a complex situation through extensive description and contextual analysis (Kohlbacher, 2006). Walsham (2006) echoed that case studies are appropriate for interpretive research in IS. Thus, in order to satisfy the aim of this study, the researcher carried out two case studies. The focus of both case studies was to identify dominant success factors of ERP implementation success in developing countries, especially South Africa. The researcher conducted case studies for the following four purposes: (1) to offer an insight into the specific nature, (2) to establish the importance of organisational culture and context between cases (Barney, 1986), (3) to study characteristics of real life instance and, finally, (4) to get an understanding of the implementation process of ERPs in SMEs operating in South Africa.

The following section provides the measures followed by the researcher to select case studies.

### 4.4.1. Justification of case studies selection

Having chosen to follow the interpretive paradigm along with multiple case studies, it is important to justify the selection of specific case studies. The criteria for selection were extracted from the literature. Table 5 summarises points which justify the selection of case studies. Headings in Table 5 are explained as follows:

- **Valuable data:** The two organisations selected were in a position to provide views and insights regarding ERP implementation success. The staff in these organisations had clear ideas about how ERP implementations were conducted. This was expressed subjectively in the form of words, phrases or text, and in data.
- **History of ICT experience:** Since it is important to examine the research problem within organisations having a record of ICT use, all organisations selected had varying degrees of experience in ERP implementation projects. Each organisation had gone through the experience of ERP implementation before.

- **Size of organisation:** The South African market is dominated by SMEs. They are the backbone of the country's economy. The researcher selected two medium organisations to ensure effective examination of the success of ERP implementation projects in South Africa.

*Table 5: Criteria of case study selection*

	<b>Case study A</b>	<b>Case study B</b>
<b>Valuable data</b>	Expert people, available documents and studies	Expert people, available documents and studies
<b>ICT experience</b>	Been 15 years in the industry and has performed one ERP implementation prior to the one being studied now.	Been 11 years in the industry and has performed one ERP implementation prior to the one being studied now.
<b>Size of organisation</b>	Medium-sized organisation with the number of employees between 40-50 and revenue per annum from R30 to R40 million.	Medium-sized organisation with the number of employees between 30-40 and revenue per annum from R20 to R30 million.

The following section explains the time horizon followed by this study.

#### **4.5. Time horizon: Cross sectional**

According to Saunders et al. (2007), the time horizon is referred to as the time framework within which the project is intended for completion. Due to time constraints, factors influencing ERP implementation success were identified at a specific point in time over a period of approximately six months. A cross-sectional timeframe was considered to be appropriate due to the constant changing nature of technologies (Levin, 2006).

The next section describes procedures followed to collect and analyse data.

---

## **4.6. Data Collection and analysis**

### **4.6.1 Interviews**

The qualitative interview is an important tool for data gathering (Klein & Myers, 1999; Northcutt & McCoy, 2004). The researcher used semi-structured interviews to understand dominant factors which influence the success of ERP implementation projects. Semi-structured interviews allowed the researcher to improvise, although questions were prepared beforehand (Myers & Newman, 2007). Interviews also contained closed-ended questions for demographic purposes. To obtain a broad opinion, the interviewee was asked to mention and explain major factors which influenced the outcome of the implementation. Twenty face-to-face interviews were conducted on the organisation's premises and five Skype interviews were used in instances where the participants were not available for face-to-face interviews.

Although, interview questions were designed to be clear (Kvale, 2007), the researcher further elaborated on questions which seemed hard to be understood by the interviewees. To ensure that nothing was missed from the interview sessions, the researcher asked permission to record interviews and at the same time took notes with a pencil and a paper. After each interview, the researcher reviewed interview questions and rephrased them when deemed essential. Each interview was scheduled for forty-five minutes. Interview questions were based on the conceptual framework defined in chapter three (See appendix A). Before each interview, participants were made aware that their responses would be confidential and they were presented with the letter of approval from the Ethics committee. The following section presents data analysis techniques.

### **4.6.2. Data analysis techniques**

Unlike quantitative research which uses standard statistics software to accurately analyse collected data, qualitative research is comprised of more text work. The researcher employed the thematic analysis of Fereday and Muir-Cochrane (2006). Based on this approach, this study utilised previously identified themes (refer to Chapter 2) and newly emerged factors (shown in chapter 5) to analyse the data. NVIVO was used as software to assist qualitative data analysis in two case studies. The next section describes the data analysis procedure.

---

### **4.6.3. Data analysis procedure**

According to Fereday and Muir-Cochrane (2006), it is important for the researcher to repeatedly listen to each audio record in order to accurately transcribe data. Appendix B provides two samples of transcribed files. Data analysis commenced without delay after all data had been collected for each case study. The researcher transcribed all data and wrote general ideas about participants' thoughts. Findings were then fitted into the table of initial themes identified. Since this study used thematic analysis, the researcher then started to seek patterns by coding the data by organising words and phrases (Miles & Huberman, 1994). Factors previously identified in the initial framework (refer to chapter 3) were coded and presented as the first set of codes. Thereafter, themes were highlighted and evaluated. Newly identified factors were classified into themes. Through the researcher's own understanding and interpretation, analytical discussion about themes and factors and their interrelation were performed – this gave meaning to data. The next section presents an overview of NVIVO analysis.

### **4.6.4. NVIVO**

Using the template from the literature, coding schemes were formulated and manuscripts were copied and pasted in NVIVO to make the correlation between codes and sentences. Thereafter, the researcher relentlessly compared data analysed to ensure that newly emerged factors were included (Egan, 2002). The coding process was continuous and involved three main activities, namely: naming, comparing, and making notes. The software NVIVO allowed the researcher to finish the coding process in an efficient manner – this led to updating the framework accordingly. As suggested by Ishak and Bakar (2012), a set of words and phrases was decided to constitute the level of analysis through nodes, as shown in Figure 7.

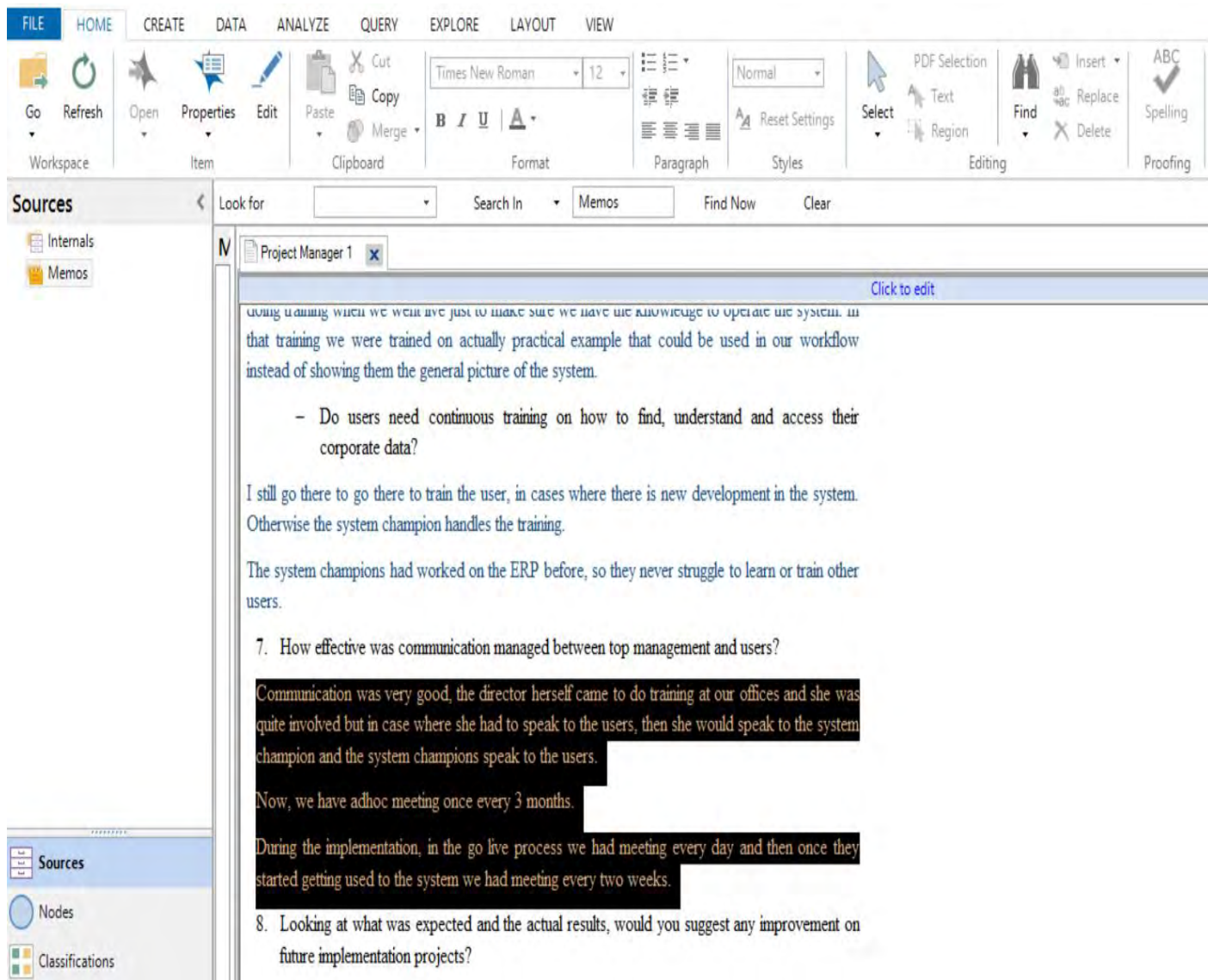


Figure 7: Coverage of sources and nodes defined by the researcher

To distinguish between concepts, the researcher compared the two scheme coding with most citations (ERP suitability and Top management support) in interview sessions as shown in Figure 8. The arrows in figure 8 illustrates the sources of citations and codes.

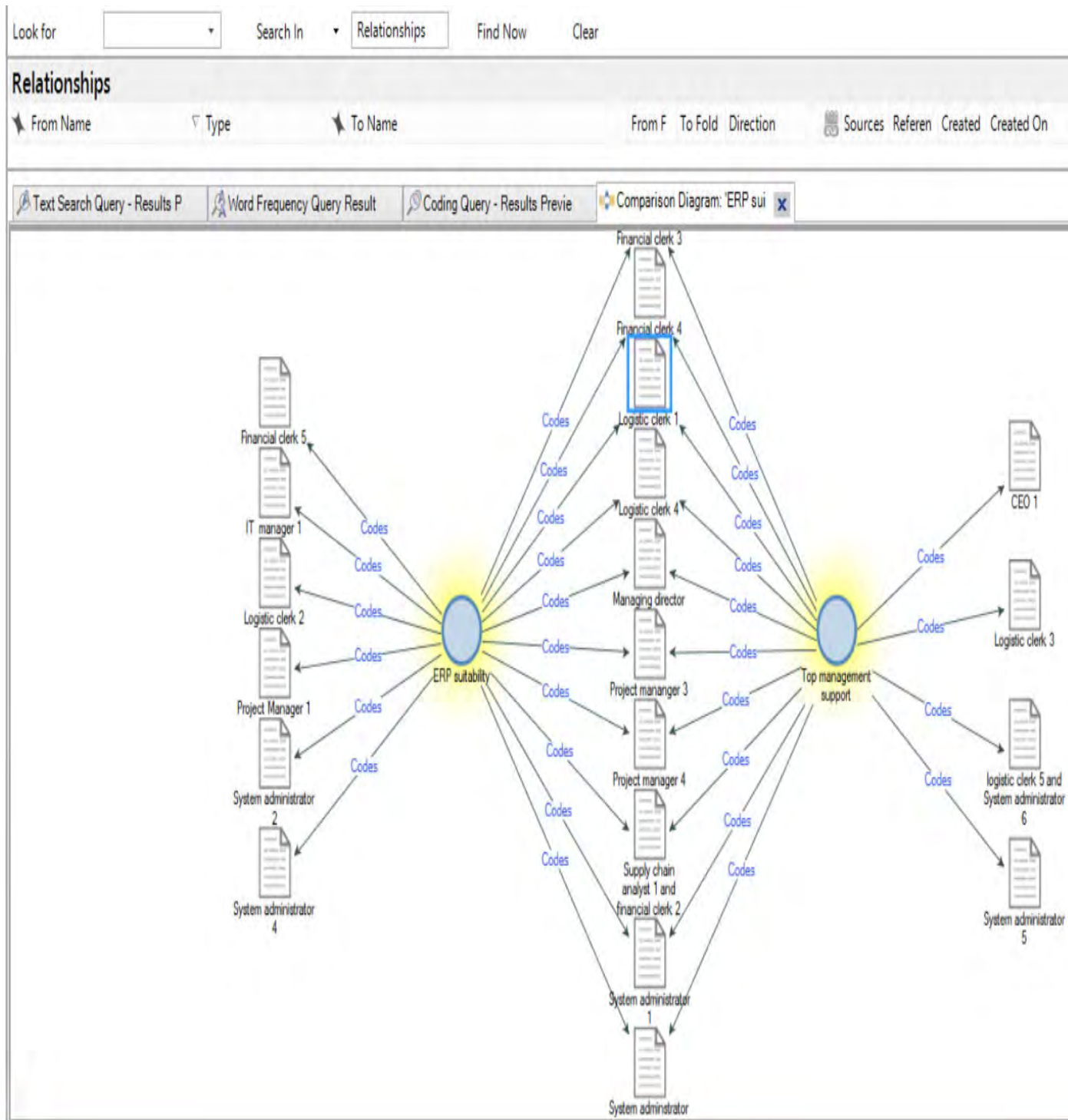


Figure 8: Nodes illustrated by majority codes citations,

### a. Transferability

The analysis of findings produced 13 factors instead of 14 factors because “trust” was removed from the success factors list due to paucity of occurrences in interview sessions. Yin (2009) claims that analysis in case study research depends upon the author’s own style of rigorous

---

thinking. Since, the qualitative analysis performed in this study aimed to reveal dominant success factors influencing ERP implementation in South African SMEs, it was important to prove rigour of these findings and to ensure good quality of research, as suggested by Venkatesh, Brown, and Bala (2013). Therefore, the researcher used transferability in order to check and improve the research quality as well as to achieve dependable conclusions (Anney, 2014).

**i. Rich, thick description**

The researcher produced full details of each and every piece of information provided during the research time. The use of the qualitative approach helped to gain rich data, with many examples and a comprehensive explanation, providing thick description of the whole process. According to Merriam (1995), a rich and thick description allows readers to make decisions regarding transferability through details of participants and settings under investigation. Thus, the researcher stated that the level of detail provided in this study was to enable to determination of dominant factors influencing success of ERP implementation in South African SMEs.

#### **4.7 Sampling technique**

This study was limited to two case studies. The nature of the ERP implementation process in each case study was limited to employees who had experience in at least one ERP implementation project. Numerous researchers have reported the difficulty in choosing the right sampling technique since it depends on the research method. As Marshall and Rossman (1999) suggest, this study used purposive sampling to answer the qualitative questions posed. The purposive sampling technique is a type of non-probability sampling that is most effective when one needs to study a certain cultural domain with knowledgeable experts within (Tongco, 2007). The purposive sampling method was deemed appropriate to this study because the researcher set criteria which had to be filled in order to participate in the research.

#### 4.8. Description of sample data

This study utilised two SMEs as the instrument to target employees with experience regarding the ERP implementation process. Twenty face-to-face interviews were conducted on the organisation's premises and five Skype interviews were used in instances where the participants were not available for face-to-face interviews. Accordingly, purposive sampling was used to calculate the sample size. Table 6 presents the description of sample data.

*Table 6: Participants' demographic details*

<b>Participant</b>	<b>Organisation</b>	<b>Experience</b>	<b>Gender</b>
<b>Managing Director 1</b>	Company A	12 years	Female
<b>System administrator 1</b>	Company B	3 years	Female
<b>System champion 1</b>	Company B	5 years	Male
<b>Financial clerk 1</b>	Company A	7 years	Female
<b>Financial clerk 2</b>	Company A	3 years	Female
<b>Project manager 1</b>	Vendor	6 years	Male
<b>Project manager 2</b>	Vendor	4 years	Male
<b>System administrator 2</b>	Company B	5 years	Female
<b>IT manager 1</b>	Company A	3 years	Female
<b>System administrator 3</b>	Company A	4 years	Female
<b>Project manager 3</b>	Vendor	15 years	Male
<b>Financial clerk 3</b>	Company B	3 years	Female
<b>Logistics clerk 2</b>	Company B	3 years	Female
<b>Logistics clerk 3</b>	Company A	8 years	Male
<b>Financial clerk 4</b>	Company B	7 years	Female
<b>Project Manager 4</b>	Vendor	9 years	Female
<b>System administrator 4</b>	Company B	3 years	Female
<b>Supply chain Analyst 1</b>	Company A	6 years	Male
<b>System champion 2</b>	Company A	12 years	Male
<b>Logistics clerk 4</b>	Company A	5 years	Female
<b>System administrator 5</b>	Company A	3 years	Female
<b>Logistics clerk 5</b>	Company A	4years	Female

<b>CEO 1</b>	Company A	7 years	Male
<b>System administrator 6</b>	Company A	3 years	Male
<b>Supply chain analyst 2</b>	Company B	5 years	Female

To elaborate further, participants were classified according to certain aspects of their demographic details. The following section classifies participants according to work experience.

#### 4.8.1. Classification of participants by work experience

Work experience plays an important role in influencing implementation success (Shah et al., 2011). Findings show that the majority of participants in this study had between five to seven years of work experience, while participants with more than 12 years were the least in numbers. Project manager 2 clarified the reason behind this phenomenon:

*Oldest employees were easily threatened by the new system and struggled to adapt. They constantly questioned why they had to learn new ways of doing things. This was partially due to the fact that companies' leaders failed to adequately communicate benefits and convince users the importance of implementing a new system. Most of these employees lost interest and end up resigning (Project manager 2).*

Figure 9 illustrates participants' categories according to their experience.

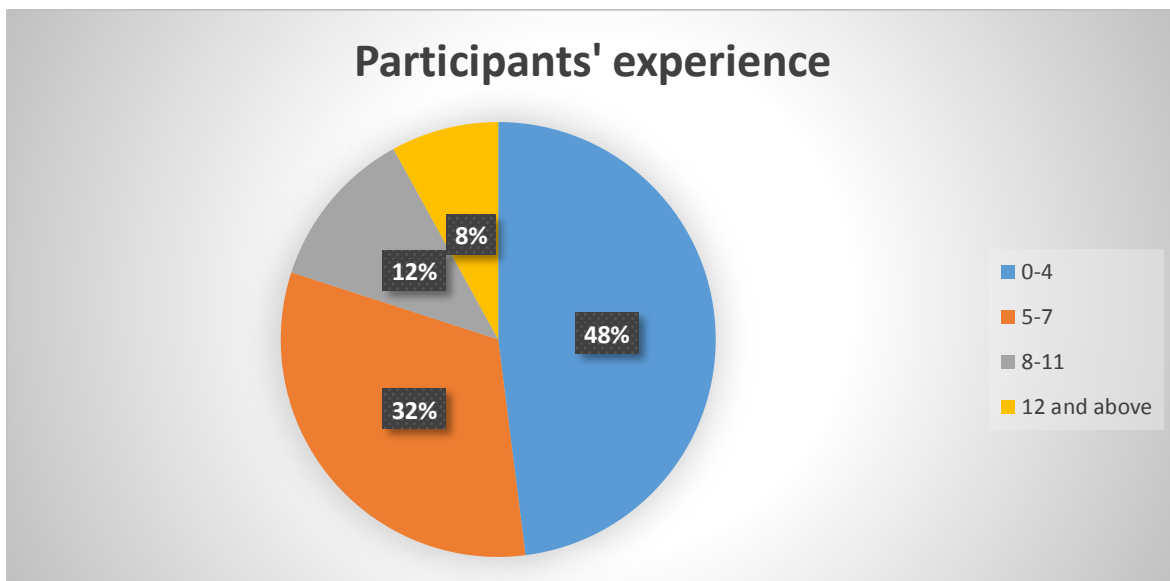


Figure 9: Participants' experience

#### 4.8.2. Classification of participants according to their official appointment

Official appointment dictates tasks assigned to employees through the implementation process (Al Rashid, 2012). Knowing participants' official appointment allowed the researcher to understand the extent to which each participant was involved in the implementation project. When asked about responsibilities assigned during the implementation process, Project manager 1 explained:

*As a Project manager, there is a set of actions we ought to do in order to implement a system. First, we have to get to know the client's workflow. Then, we discuss technical aspects to make sure that the system can cater for all the client's needs. In cases where the system falls short, we suggest additional development to the current system. Once discussions are finished and both parties are satisfied, we then establish the magnitude of work involved and time it will take to complete implementation. Once the client signs off all documents required for the implementation, we then proceed with the actual implementation process (Project manager 1).*

Figure 10 classifies participants according to their official appointment.

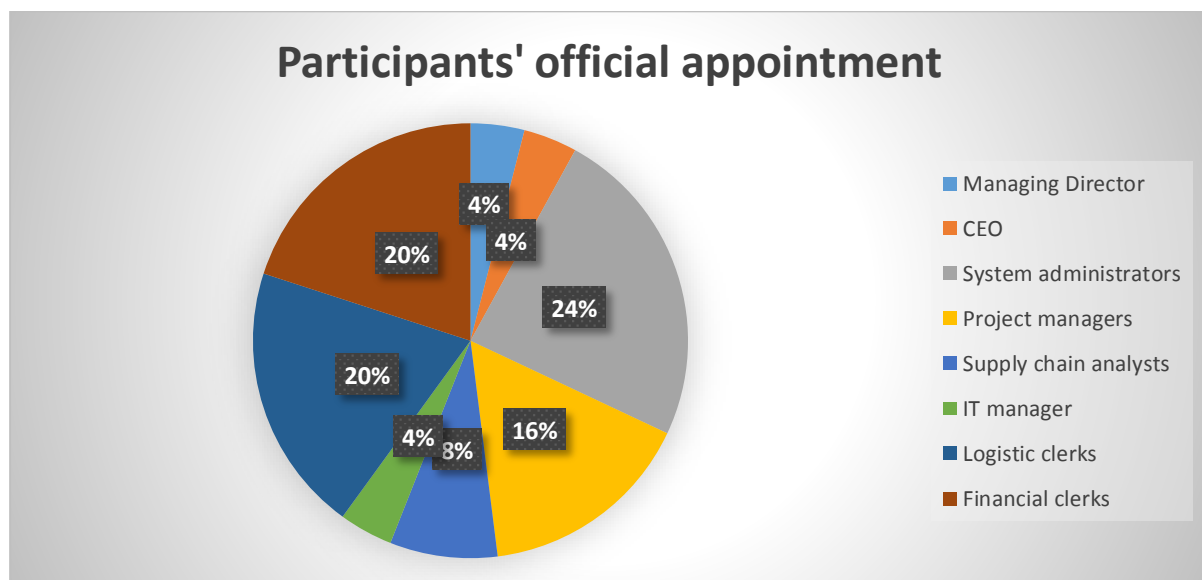


Figure 10: Participants' official appointments

### 4.8.3. Classification of participants by gender

In order to gain opinions from diverse genders, the researcher interviewed both males and females. As illustrated in Figure 11 there were many more females than male participants.

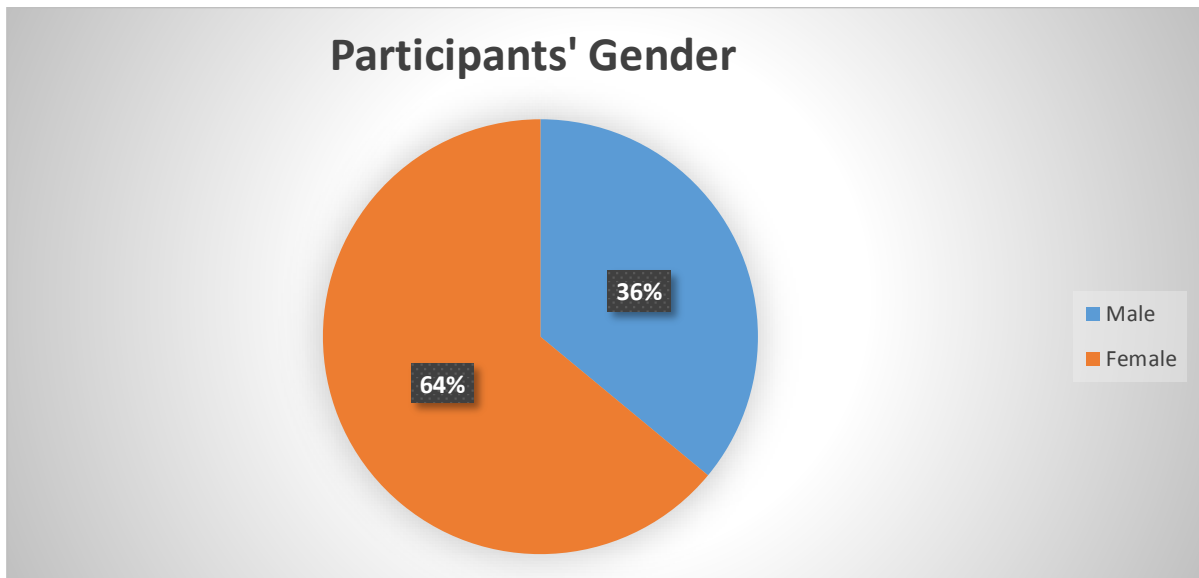


Figure 11: Participants' gender

### 4.8.4. Respondents' roles and responsibilities in ERP implementation projects

In order to ensure the success of an ERP project, a number of aspects should be considered. Roles and responsibilities should be well-balanced to guarantee a good combination of knowledge, skills, and experience (Al Rashid, 2012; Chetcuti, 2008; Sritharan, 2006; Swain, 2013).

The next section describes various roles played by participants and how these roles affect the implementation outcome.

#### *a. Project sponsor*

The success of an ERP implementation project is greatly dependent on the ERP sponsor since he/she is in charge of taking ownership of the project, while ensuring that top management work towards the goals set to be achieved (Esteves & Pastor, 2001). Previous researchers have tried to define different roles of an ERP sponsor in an implementation project. Chetcuti (2008)

---

echoes that commitment of a project sponsor consists mainly of overseeing the entire implementation life cycle, ensuring that the ERP project is funded as required. Al Rashid (2012) adds that an ERP sponsor is required to control daily project-related issues and resource requirements. Lack of commitment of the ERP sponsor can lead to failure (Althonayan, 2013). This study has classified the Managing Director and CEO as project sponsors.

***b. System champions***

An ERP system champion is required to ensure that the ERP is integrated in the organisation by managing change, at the same time helping users to build acceptance and confidence in the system (Chetcuti, 2008; Sedera & Dey, 2006). This support can only be achieved if end users are encouraged to utilise the ERP from the start to the end of the ERP implementation. Apart from managing the project, system champions manage teams and ensure that they are working towards the agreed project goals. Thus, it is their responsibility to bridge the gap between ERP sponsors and end users (Chetcuti, 2008). This study has classified IT managers and supply chain analysts as system champions.

***c. ERP vendor***

According to Rajapakse and Seddon (2005), the majority of organisations in developing countries do not have the expertise to develop in-house ERPs; this often leads to hiring external ERP vendors. The role of vendor consultant is to implement the ERP, provide both technical and business expertise, and configure and train the users. Skills of the external project manager involve leadership, stress resistance and analytical abilities. Esteves and Pastor (2001) suggest that project managers are required to seek advice and report to the steering committee about the project status and direction. Project managers considered in this study are external as they are classified under the vendor consultant group.

***d. ERP users***

ERP users are important as they possess the knowledge of business processes. Chetcuti (2008) encourages the participation of users in the ERP implementation process since this decreases resistance to change and also helps to get a realistic expectations of the ERP (Esteves & Pastor,

2000). Organisations are required to ensure that users are extensively trained in order to effectively handle the system. This study classified system administrators, logistic clerks and financial clerks as users.

Table 7 summarises participants’ official appointment according to their groups.

Table 7: Participants’ roles and responsibilities

Roles and responsibility groups	Official appointment
<b>Project sponsor</b>	<ul style="list-style-type: none"> <li>- Managing director</li> <li>- CEO</li> </ul>
<b>System champions</b>	<ul style="list-style-type: none"> <li>- IT manager</li> <li>- Supply chain analysts</li> </ul>
<b>Vendor consultants / implementation team</b>	<ul style="list-style-type: none"> <li>- Project managers</li> </ul>
<b>ERP users</b>	<ul style="list-style-type: none"> <li>- System administrators</li> <li>- Logistic clerks</li> <li>- Financial clerks</li> </ul>

Figure 12 classifies participants according to their groups.

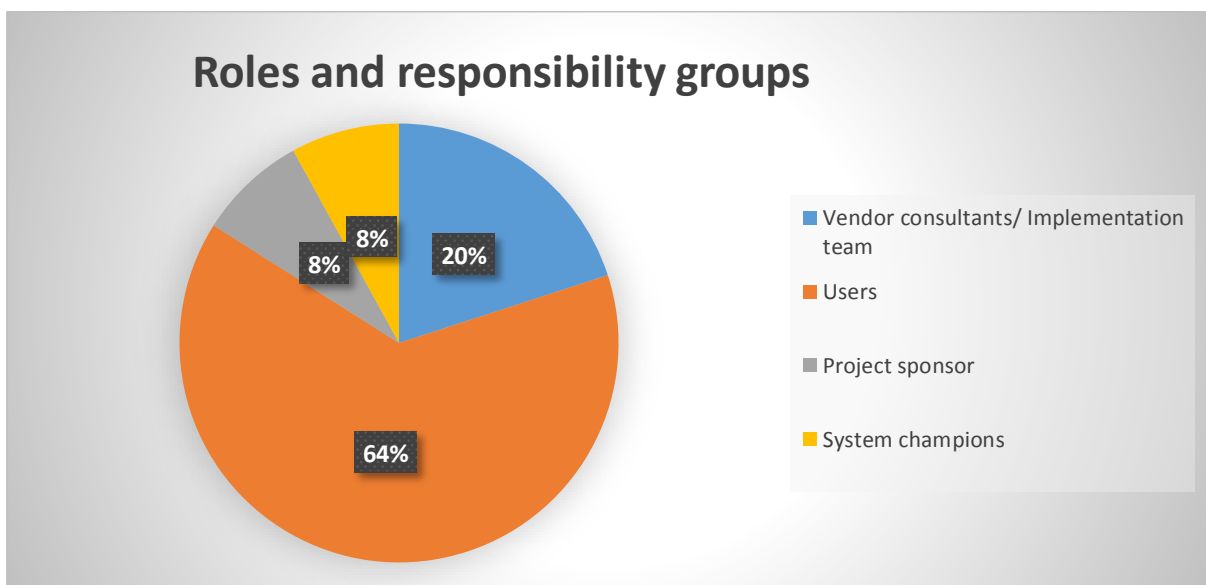


Figure 12: Participants’ groups.

---

## **4.9. Description of case studies**

This section describes cases studies involved in this study. Case study A and B share the following points:

- (1) They both operate in the fruit industry to trade fruits and vegetables to local and foreign markets.
- (2) Both case study A and B share the same vendor.
- (3) Interviews in both case studies happened after the ERP system had finished being implemented.
- (4) Both case studies are privately owned companies.
- (5) Both companies are located in Cape Town.

### **4.9.1. Case study A**

Due to continuous changing environment, the previous ERP system could not fully satisfy all company A's needs. Top management realised that an ERP solution was needed to effectively integrate and manage business processes. Therefore, company A decided to implement a new ERP system in order to meet its requirements, managing and integrating logistical and financial modules. Company A is active across the fresh produce value chain such as: fruit plantation and growth, fruit packing, and fruit trade. The ERP is mainly used to pack, grade, dispatch fruits, track sales and costs, in order to ultimately pay the producers. The vendor team was in charge of the implementation, configuration, as well as training the users. The implementation process lasted six to nine months to get to a point where the users were able to handle the system efficiently. Although company A currently uses about 75% of the software's full functionality, this software provides significant advantages in dealing with both suppliers, customers, as well as other parties in the supply chain. Amongst the benefits stated for ERP, are: (1) instant access to information for reporting/queries for suppliers, growers, and customers; (2) better generation of account sales and remittances; (3) automatic generation of reports; and (4) financial bank reconciliation. Despite all above-mentioned benefits, users found the system complex and the implementation process took longer than planned.

#### 4.9.2. Case study B

Company B was established as a family business a decade ago. An in-house system maintained by the internal IT department was in place prior to the implementation of system B. To enhance business practices, company B installed the full ERP suite to improve basic data input, complex views, and reports. Company B packs citrus for customers in Japan and the Far East. Company B uses the ERP as a one-stop system for intake stock control, finance, and forex control. Working with top-class producers, company B ensures that all of them are accredited for the various markets. The implementation, customisation, and user training were performed by the vendor team. The implementation took more than a year. Company B top managers reported that the implementation process had been a tough task since most experienced personnel had neither system knowledge nor full commitment. The implementation at company B was considered a partial success because only a few expected net benefits were realised in the expected time. Table 8 summarises the criteria and background of each case study.

*Table 8: Case studies' background*

<b>Dimension</b>	<b>Company A</b>	<b>Company B</b>
<b>Background</b>		
<b>Industry</b>	Export of perishable products	Export and import of perishable products
<b>IT infrastructure</b>	ERP installed and implemented by software vendor	ERP installed and implemented by software vendor
<b>Service provider</b>	Service provider A	Service provider A
<b>ERP package implemented</b>	System A	System B

The next section discusses techniques that the researcher followed to avoid bias.

---

#### **4.10. Role of researcher and avoiding bias**

Bias is referred to as “any tendency which inhibits neutral consideration of a question. In research, bias arises when a methodical mistake is introduced into encouraging the outcome or answer over others”. Bias can occur at any phase of research, including study design or data collection, as well as in the process of data analysis (Tourangeau & Yan, 2007). Since the researcher is currently implementation consultant at the vendor firm considered in this study, the following was followed to avoid bias:

- (1) formulating good questions by allocating adequate time to formulate interviews,
- (2) giving feedback to the interviewee in instances where it was needed,
- (3) carefully listening to interviewees from different hierarchies, and
- (4) Understanding and responding to the questions in order to establish which questions were suitable for all interviewees.

#### **4.11. Ethical consideration**

Ethical principles were followed throughout the research process. Each participant was treated with respect by giving him/her the freedom to make their own decisions regarding to the participation in the study. All interviews were conducted personally. Prior to each interview, the interviewee was contacted directly or via Skype, in order to provide them with general background to the research, ethics committee approval and information needed. Furthermore, a covering letter containing the researcher’s background and the aim of the research was handed to the interviewee, as well as a letter guaranteeing that all information provided and interviewees’ names would remain confidential. Permission was given to record the interviews and the recorder was switched off whenever requested. The ethics proposal number considered by this study is 10-2015.

#### **4.12. Chapter summary**

This chapter detailed the research methodology followed by this study. Section two explained the concept behind the research philosophy, while section three presented the research

---

approach. The research strategy was described in section four, while section five explained the time horizon used by this study. Data analysis techniques were described in section six. The descriptions of sample data and case study were provided in section seven and eight, while the role of the researcher to avoid bias was described in section nine. Section ten explained the ethical consideration taken by the researcher in order to collect the data used in this study. Finally, section eleven presented the summary of the chapter.

In the next chapter, the analysis and discussion of finding will presented.

---

## **Chapter 5. Empirical Findings and Analysis**

### **5.1. Introduction**

This chapter presents analysis of findings which originated from the qualitative approach. The aim of this chapter is: (1) to confirm the significance of dominant success factors identified in chapter two, (2) to record newly emerged dominant success factors as well as IS success indicators, (3) to establish relationships which emerged between dominant success factors and success indicators, and (4) to propose the final framework for ERP implementation success in South African SMEs. Accordingly, this chapter is structured as follows:

1. **Section 5.2** presents the data findings and data analysis of dominant success factors.
2. **Section 5.3** presents the analysis of findings of IS success indicators.
3. **Section 5.4** proposes the final framework for ERP implementation in South African SMEs.
4. **Section 5.5** provides the summary of the chapter.

### **5.2. Analysis of dominant success factors and emerged relationships**

The main objective of this section is to analyse and validate existing success factors which were identified from findings while exploring the occurred relationships. To achieve this, the researcher used the interview sessions to record the number of occurrences of each factor. Dominant success factors were categorised into three different contexts, namely: (1) Technological, (2) Organisational, and (3) Environmental context.

Analysis of findings indicated that the technological context is comprised of five dominant success factors. Four (ERP flexibility, ERP suitability, customisability and data accuracy) of the five success factors which comprise the technological context were identified in the review of literature. However, one success factor emerged, namely, timeliness. Furthermore, the review of literature indicated that the organisational context was comprised of nine dominant success factors, namely, top management support, change management, business process reengineering, trust, implementation resources, communication, user training, user involvement, and team skills and commitment. However, factors such as business process reengineering and implementation resources and trust were removed from this list due to

paucity of occurrences in interview sessions. The environmental context was constituted of two dominant success factors (vendor support and project management). This context remained the same as none of the factors emerged from the findings and no factor was removed from the list. Table 9 presents the final list of thirteen dominant success factors.

*Table 9: Updated dominant success factors*

<b>Contexts</b>	<b>Factors</b>	<b>Case A counts</b>	<b>Case B counts</b>	<b>Total</b>
Technological context	ERP suitability	16	11	27
	Data accuracy	13	12	25
	Timeliness	12	10	22
	ERP flexibility	12	8	20
	Customisability	9	11	20
Organisational context	Top management support	15	13	28
	Change management	12	14	26
	Team skills and commitment	15	9	24
	User training	10	14	24
	User involvement	12	10	22
	Communication	12	6	18
Environmental context	Vendor support	15	14	19
	Project management	12	15	17

The next section presents analysis of the thirteen dominant success factors categorised into their contexts.

### **5.2.1. Technological context**

This section discusses the following dominant success factors: ERP suitability, data accuracy timeliness, ERP flexibility and customisability.

---

*a. ERP suitability*

**Analysis**

ERP suitability denotes the manner in which ERP modules are integrated in business processes. The majority of participants agreed upon the importance of ERP suitability. ERP suitability was recorded twenty-seven times during interview sessions. Supply chain analyst 2 stressed the importance of ERP suitability in the following statement:

*Our industry is quite sensitive because we export and import perishable products. We need to be careful about how long our inventory stays in stock, at the same time making sure that quality is maintained. It is therefore hard to find a system which suits all those needs. Luckily, the system we implemented was uniquely developed for our industry, which made it a lot easier to manage our inventory (Supply chain analyst 2).*

**Discussion**

According to Herrera, Herrera, Viedma, Sánchez, and Martínez (2009), organisations are required to assess the ERP suitability through a set of parameters in order to decide the viability of the implementation. A highly suitable ERP system helps to achieve a good project performance (Chen et al, 2009). The fruit industry has started to address this problem by implementing systems with random access storage and installing warehouse management softwares (Van Dyk & Maspero, 2004). Logistic clerk 4 explained that a suitable system is essential not only because of the market environment, but also due to level of details which need to be recorded on each product.

*The fruit industry is quite unique because all fruit's specifications such as commodity, variety, size, brand, mark, inventory code, and target market need to be taken into consideration. Most systems out there do not report to this level of granularity. In the past we had to capture all the fruits' specifications manually in Excel (Logistic clerk 4).*

---

## ***b. Data accuracy***

### **Analysis**

Data accuracy was classified as an important factor of ERP implementation. Data accuracy was classified as a technical factor due to the fact that the system is required to provide checks and validations to warn or stop the user in cases where wrong data is being captured in the system. Data accuracy was mentioned 25 times. One of the participants stressed the importance of data accuracy in the following statement:

*Our system is highly integrated which means that wrong data in one module affects all other modules. We receive data from five branches on a daily basis; if the data from one of the branches is wrong, it messes up our whole reporting process. Basically, garbage in, garbage out (Logistic clerk 5).*

### **Discussion**

Due to the integrated nature of ERP systems, erroneous data has a negative effect throughout the ERP modules (Kambarami et al., 2012). If inaccurate data is entered into one module, it could adversely lead to errors in other modules such as market planning, production planning, material procurement, capacity acquisition, etc. (Zhang et al., 2005). Findings show that although the ERP provides checks such as validations and warnings, some participants were not aware that they needed to ensure that accurate data was entered in the system. For example, financial clerk 3 felt that the system should be able to detect all errors without intervention of human capacity. The following statement was extracted from interviews:

*“I expect the system to make sure that the correct product goes to the correct client when I sell a specific pallet with any fruit specifications. The system should be able to stop us if there is any data error whatsoever” (Financial clerk 3).*

---

### ***c. Timeliness***

#### **Analysis**

Timeliness is referred to as the system ability to provide the user with required information easily, accurately, and quickly. Timeliness was mentioned 22 times during interview sessions. Findings show that participants in both case studies were aware of the importance of timeliness. System administrator 6 explained:

*It is critical for us to be able to access information on time. For example, when the pack-house has finished loading the pallets into a truck, we need to send a dispatch note to the harbour so they may know details about what needs to be shipped. If we are not able to print those dispatch notes, the truck has to wait until the dispatch note is retrieved from the system. This has a very big financial impact because we are charged for every minute the truck stays on our premises while waiting for the report to be printed (System administrator 6).*

#### **Discussion**

According to Dlodlo (2011), the main drive of any organisation in implementing an ERP system is saving time, reducing redundancy and improving organisational productivity. The latter can only be achieved if the system is capable of performing tasks faster and more efficiently. DeLone and McLean (2003) argue that timeliness can be achieved when users are able to complete their work in a shorter time and in a timely manner. The majority of participants stated that the system achieved quick retrieval of information in most modules. Nonetheless, there was a concern that some reports were very slow to retrieve due to large amount of data. Quoting project manager 4:

*We are currently struggling with the amount of data in the system. Reports with less data are very quick to retrieve, as opposed to reports with a lot of data which can take more or less 40 minutes to retrieve (Project manager 4).*

---

#### *d. ERP flexibility*

##### **Analysis**

ERP flexibility is referred to as the ability to modify system modules in order to accommodate future changes in business rules. ERP flexibility appeared twenty times during the interview sessions. Participants stated that lack of ERP flexibility can have a significant effect on the implementation success. Supply chain analyst 1 expressed that the company incurred unexpected extra costs because the system didn't fully achieve flexibility.

*. . . We had to invest into an additional module to accommodate the market changes which occurred when the PPECB group (Perishable Products Export Control) decided to amend the fruits' inspection procedure. They expected our system to accommodate it accordingly (Supply chain analyst 1).*

Nevertheless, findings demonstrated that participants had different views on system flexibility. System champions felt that flexibility is achieved if the system can easily conform to requirement changes, while end users felt that ERP flexibility is the ability to view data in different ways such as reports, views, dashboards, etc.

*We have standardised operational and data warehouse views which can show data from current and past years. The system allows us to extract data directly to Excel and other views. We don't even have to be logged into the system to retrieve information. We can just use a desktop application to get the information we need (System administrator 5).*

On the other hand System champion 1 expressed:

*Our current system has achieved some degree of flexibility in times of reporting, but as a system champion, I look to having a higher degree of flexibility where the system can easily be updated to accommodate future changes (System champion 1).*

---

## Discussion

According to Gong and Janssen (2012), flexibility is referred to as the “facility to efficiently respond to changing conditions”. ERP flexibility is deemed essential for ERP implementation success (Bharati & Chaudhury, 2004). Although, ERP flexibility was seen as an important factor, findings revealed that participants’ views varied according to their roles and responsibility. End users were pleased with the degree of flexibility of the system, whereas system champions were concerned with whether the system could adapt to future changes. A number of researchers (e.g. Gebauer and Lee, 2008; Gong and Janssen, 2012) believe that to be effective, the ERP needs to be flexible to cover a certain range of functions and features while allowing for variation over time.

### e. Customisability

#### Analysis

Participants agreed upon the importance of the amount of customisation. Customisability was classified as a dominant success factor because it was mentioned 20 during interview sessions. While both case studies chose to customise the ERP, participants felt that the amount of customisation of pack-house modules presented many challenges. System administrator 4 asserted:

*Although the majority of our modules didn't need to be customised, we struggled the pack-house module due to the complexity of our workflow logistic. As a result we were not able to setup Bill of materials, so we ended up dropping the whole module and built something totally new to accommodate the way we pack, sort and decant the fruits (System administrator 4).*

Though, customisability was deemed important, participants understood that over-customisation was not ideal as it would incur more costs and waste of valuable time. System champion 1 expressed:

---

*Although, there was so many other things we wanted to configure, we realised that we were not here to change the ERP, we are also here to adapt to it. Over-customisation was going to include a lot of support from the vendor which was going to affect us in a long run (System champion 1).*

## **Relationship**

Chen et al. (2009) argue that over-customisation of software leads to difficulties of future system update and maintenance. Organisations need to choose a system that suits business processes to ensure that time and cost consumed in customisation is minimised as much as possible (Zhang et al., 2005). ERP functions cannot satisfy individual enterprises at 100% (Chen et al., 2009). Findings indicate that the level of ERP suitability dictate the amount of customisation. This is supported by Al Rashid (2012), who argues that the ERP system should be suitable to match the organisation's needs while allowing less customisation. Based on this literature, there is evidence that a degree of fit is required between the ERP suitability and the customisation. Figure 13 illustrates the relationship which emerged between customisation and ERP suitability



*Figure 13: ERP suitability is a result of the amount of customisation (customisability)*

## **Discussion**

Customisation is referred to as configuration and modification of ERP software to meet organisations' needs. Zhang et al. (2005) claims that most organisations which undertake customisation of the vendor's basic product make a mistake of over-customising the system's modules, in an attempt to appease all members of ERP project teams. In the analysis of findings, participants were aware of the effect that over-customisation can have on the implementation process. Additionally, it was evident that, due to the complexity of the workflow, customisation was a challenge in certain modules of the ERP.

---

### 5.2.2. Organisational context

This section is comprised of six dominant success factors namely: top management support, change management, communication, user training, user involvement, and team skills and commitment.

#### *a. Top management support*

#### **Analysis**

Top management support was classified as a dominant success factor as it was mentioned 28 times during interview sessions. Ipinge (2010) and Kambarami et al., (2012), echoe that top management should play an important role in supporting the planning process, encouraging everyone to pull in the same direction, and ensuring that the business is better prepared for coping with unexpected events. Lack of top managers' support has a significant effect on the ERP implementation project. Project manager 3 explained that the implementation project in case B was completed late and over budget due to lack of commitment and support from the top manager.

*There was many times where requirements had to be repeated because the top manager had a habit of changing his mind on already-made decisions. This originated from the fact that he thought he didn't need to spend time understanding and supporting the project (Project manager 3).*

#### **Discussion**

According to Bhagwani (2009), implementation success is largely influenced by top management support since they are responsible for determining, clarifying, and communicating a consistent message of support to the implementation team. Zhang et al. (2005), adds that in order to implement an ERP system smoothly, businesses require a steering committee to participate in team meetings, to monitor the implementation efforts, to spend time with people and to provide clear directions of the project.

---

## ***b. Change management***

### **Analysis**

Change management is referred to as the ability for the organisation to adapt to change. Change management requires a change of employees' attitude towards the project. Change management was recorded 26 times during the interview sessions. The importance of change management was stressed in the following statement:

*Since this project was not our first implementation, we already knew that the introduction of a new system could affect our business if not well managed. So, we made sure that the users were motivated and understood the reason why we were moving from one system to another (CEO 1).*

### **Relationship**

To enable successful implementation, top management ought to play an important role as leaders and facilitators of change (Chetcuti, 2008). Lack of top management support is considered a major reason for the failure of implementation (Al Rashid, 2012). Participants from case study A supported this statement in the following statement:

*In early stages of the implementation, top management tried to inform users about the changes which were likely to occur once the new system is implemented. Users were also warned about the shift in roles and responsibilities (Project manager 2).*

Based on this statement, top management support has an influence on change management. The relationship which emerged is shown in Figure 14.



*Figure 14: Top management support has an effect on change management*

---

## Discussion

According to Odhiambo (2010), it is important for top managers to inform employees about implementation, in order to help them gain the consensus needed for change. Absence of understanding as to how the system is going to change an organisation's business processes often results in a failed implementation (Heeks & Hawari, 2010). Case study A proved that the managing director was able to spot and resolve potential difficulties associated with change such as the gap between employees' attitude, implementation processes, etc.

### *c. Team skills and commitment*

## Analysis

There was consensus that team skills and commitment were essential success factors as they were recorded 24 times in interview sessions. Findings demonstrated that the majority of participants were aware of the importance of team skills and commitment. In this context, the team is comprised of systems champions as well as users (system administrators, logistic clerks, financial clerks). The importance of team skills was stressed in the following statement:

*We knew we had shortages in skills, so we encouraged users to learn quickly. Luckily we had a committed IT department which helped a lot throughout this process (IT manager 1).*

## Discussion

Every organisation needs staff members who are committed and care about its mission (Dezdar & Ainin, 2011). Having knowledgeable, experienced, and dedicated staff is a requirement to facilitate a successful ERP system implementation (Odhiambo, 2010). Both case studies agreed that team skills and commitment are essential for ERP implementation success. Although, some users were not equipped with the required skills, project managers tried to involve them in activities which encouraged them to learn and interact with other members.

---

#### *d. User training*

##### **Analysis**

The majority of researchers echoed that user training is an essential factor in implementing and operating ERP systems successfully. Having an appropriate user training method to develop human capacity is one of the most important concerns among the ERP success and failure factors (Dlodlo, 2011). ERP systems, like other new technologies in an organisation, need training of the staff to make them able to manipulate the system in a correct and effective manner (Kalema et al., 2014). User training was mentioned 24 times during interview sessions. Participants in both case studies were trained by external project managers. One participant stressed the importance of user training in the following statement:

*We are aware that user training has a huge impact on the implementation since users are in charge of operating the system when it goes live (IT manager1).*

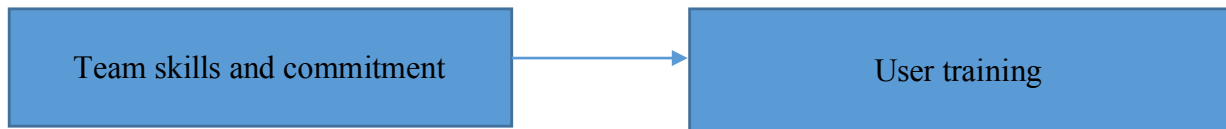
Regrettably, user training was found to be inadequate and overwhelming. The majority of participants felt that training didn't focus on their specific workflow which affected the users' overall system knowledge. The following statement was made by Logistic clerk 1 to explain how training was conducted:

*The training was incorrectly positioned. Everything seemed simple and easy but it became a different story when we got to the point of using the system ourselves. Also, we spent so much time on the pack-house processes while we do not even edit pallets in the pack-house. I think we should have spent more time getting to know the processes we actually use (Logistic clerk 1).*

Participants considered successful implementation impossible without a good ERP team and training. The team should be a good mix of internal and external workers to work close to each other (Heeks & Hawari, 2010). Internal workers have to familiarise external workers with organisational business processes. Likewise external workers have to train the users and fulfil the demand needs in the best way (Abbas, Mudassar, Gul & Madni, 2013).

---

Based on the above literature, it is evident that team skills and commitment has an impact on user training, as illustrated in Figure 15.



*Figure 15: User training is the result of team skills and commitment*

## **Discussion**

The majority of ERP implementation projects fail due to a lack of proper training (Ghosh, 2012). Many researchers consider user training as an important factor for ERP implementation success (Kandampully (2002; Somers & Nelson, 2004). Intensive training gives users a better understanding of the integration within the system and how the work of one employee influences the work of others (Bhatti, 2005). Regrettably, the majority of participants in this study mentioned that training did not equip them with enough knowledge. Since an ERP implementation requires a lot of knowledge, it is important for users to understand how to operate the system (Chen et al., 2009).

### *e. User involvement*

## **Analysis**

Users are an important aspect of the ERP implementation since the organisation relies on them to use the system functions after they are implemented. According to Zhang et al. (2005), the user can be involved in two areas: (1) defining the company's ERP system needs, and (2) participating in the implementation of ERP systems. The extent to which users are involved in the implementation process plays an important role in ERP implementation success. User involvement was mentioned 22 times during the interview sessions. Participants in case study B explained that the system implementation presented a threat to users' perceptions of control over their work with regard to the new system. This was due to the fact that communication regarding the change of ERP was not well managed between top managers and users. One of the participants explained:

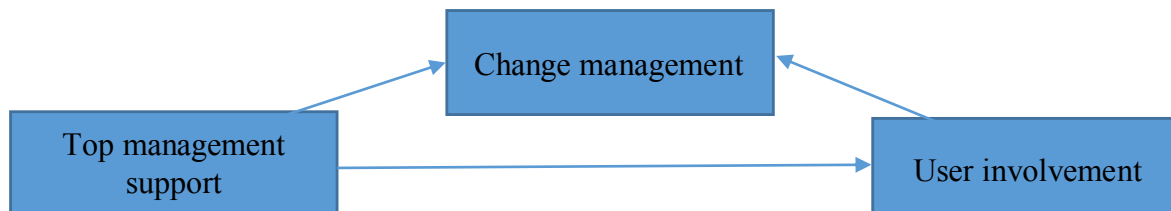
---

*Users were not involved during the implementation process which led to confusion as to why they had to learn a new way of doing things. I believe top managers could have done a better job in ensuring that users are prepared both mentally and intellectually (Project manager 2).*

## **Relationship**

According to Hart (2010), user involvement decreases negativity towards a potential ERP system. As opposed to company B, participants in company A explained that users were informed about and prepared for the change which occurred when the new system was implemented.

Analysis of findings reveals that top management support has an impact change management as well as user involvement. It is arguable that this kind of top management support influences users' involvement in the project. Furthermore, user involvement influences change management due to the ability to reduce the resistance to change from the users. Figure 16 shows the relationship between user involvement, change management, and top management.



*Figure 16: Top management has an impact on user involvement through change management*

## **Discussion**

Several studies in literature emphasise the importance of involving users in the implementation process. User involvement during implementation plays an essential role in enhancing employees' understanding, acceptance, and efficiency in respect of the new system (Ahmed & Khan, 2013). Findings show that, due to lack of user involvement, change was misunderstood; this affected the outcome of the implementation in case B. Top management did not care to inform nor convince the employees about the benefits ERP implementation.

---

## *f. Communication*

### **Analysis**

Communication was considered one of the dominant success factors as it was recorded 18 times during the interview sessions. Participants from case A explained that communication took place during regular meetings where project progress was assessed and was communicated to every member concerned. They mentioned that a number of strategies were used to communicate. For example, wall charts were placed in obvious locations to ensure that everyone was aware of the project progress. On the other hand, participants in case B asserted that communication was not as effective as they would have liked it to be. Financial clerk 3 explained:

*Communication was mostly done by email. Once in a while, the external project managers would come to our offices to assist with the implementation. It could have been better if we had them on site more often because it is much easier to tackle problems face-to-face as opposed to using emails (Financial clerk 3).*

### **Relationship**

According to Joubert (2002), communication should reach all levels in the company, from upper managers to bottom operators. Users should know what they can expect in the implementation process. Participants from case B explained that orders were passed verbally which resulted in lack of understanding of responsibilities towards the project. The following quotes illustrate how communication was handled:

*Most instructions were lost in translation since only system champions were allowed to communicate with top managers. Some sort of hierarchical communication process was followed. For example, if the top management needed to inform something to users, they would speak to the system champions then system champions would speak to us (System administrator 1).*

This statement is supported by Steyn and Puth (2000), who state that the majority of top managers are not interested in communicating with the team as they are looking for solutions to critical problems. This was also supported by Van Vuuren (2002), who echoed that hierarchical communication is still applicable in South African SMEs. The main reason seems to be that top managers fail to play a strategic role in organisational decision making, and to link communication to the achievement of organisational goals (Steyn & Puth, 2000). Based on this literature, there is evidence that a relationship exists between top management support and communication. Figure 17 illustrates the relationship which emerged.



*Figure 17: Communication is a result of top management support*

Project manager 1 also explained that change brought by ERP is influenced by the communication strategies in the organisation.

*The managing director knew what we were getting into, and took time to explain to users about the change which was about to happen. Also, users were kept up to date with all the progress about the project (Project manager 1).*

This statement is supported by Dezdar and Ainin (2011), who state that communication avoids company-wide rebellion to new systems' implementation. Thus, based on this literature and statement, communication has an impact on change management, as illustrated in Figure 18.



*Figure 18: Change management is a result of communication.*

---

## Discussion

Although there was a different strategy on how both case studies approached communication, communication was still identified as an important factor for ERP implementation success. Regrettably, the need for communication is often underestimated. The communication plan should not only exist between top management and project managers; the whole organisation should be aware of the project scope, its objectives, and activities (Dezdar & Ainin, 2011). Steyn and Puth (2000) add that communication dissatisfaction arises from the fact that corporate communication practitioners are not playing a strategic or managerial role in the organisation.

### 5.2.3. Environmental context

This context is comprised of two success factors, namely: vendor support and project management.

#### *a. Vendor support*

## Analysis

System vendors have the main task of providing support to the users working with the implemented ERP. Participants stressed the need of adequate vendor support. Vendor support was mentioned 19 times in interview sessions. For example, managing director 1 described a detailed plan which was followed from the beginning phase of the implementation process.

*At the beginning of the implementation, the vendor tried to understand our business processes. We then had several meetings to go through the workflow to establish what the system can do as well as what can't be done. Once all of that was complete, we then started implementing the system (Managing director 1).*

System support knowledge affects the ERP implementation process. Identification of the skills and knowledge of the vendor is important as vendors are required to provide expertise in areas

---

where team members lack knowledge (Grabski et al., 2001). Participants mentioned that the implemented ERP is still supported, even after the implementation was complete.

*. . . In instances where we run into an error, we usually call the vendor support office or log into the vendor's website where we can log our queries. The support members immediately pick up our queries and send us solutions after a detailed investigation has been performed (System administrator 3).*

However, participants complained that some of the vendor support team lacked knowledge related to clients' specific workflows. The following statement was extracted from the interviews:

*Usually when I call the support team to ask a question, I can easily detect that there is a new member on the team because they either ask me to repeat my question a few times or delay to answer immediately. Also, there is a significant gap when it comes to knowing and understanding our own business workflow, as opposed to having general knowledge of the system (System administrator 2).*

In order to improve the user knowledge, the users need to be provided with ongoing training (Elmeziane, Chuanmin & Elmeziane, 2011). Training aims to increase the experience of users, ensuring they do things the right way; it guarantees standards and systems of work (Kumar, 2000). Participants in case A echoed that they receive training every two months to review new changes made to the system.

*We have a meeting every two months where the vendor discusses all newly built functionalities and train us on them (Financial clerk 1).*

Thus, there is evidence that user training is influenced by vendor consultants who are in charge of the training process, as shown in Figure 19.



Figure 19: Vendor support has an impact on user training

---

## ***b. Project management***

### **Analysis**

Project management is defined as the ability to plan the ERP implementation by outlining project plan, scope, and goals, at the same time ensuring that a knowledge-based view is reinforced to allow a smooth implementation. Project management was mentioned 17 times during interview sessions. Participants agreed that project management is an essential aspect to the implementation project in organisations where staff is inexperienced. For example, project manager 3 mentioned that case B required a lot of attention since the organisation was quite new in the industry.

*When we noticed that the firm had little experience about ERP implementation projects, we helped them to define the plan, scope of the project as well as staffs' roles and responsibility (Project manager 3).*

### **Relationship**

According to Grabski et al. (2001), project management is necessary to keep abreast of progress and to shape the implementation. Since, case study B was owner managed, project managers were restrained on decision making which affected implementation completion time. Family-owned SME literature suggests that business ownership, independence, and family control factors affect owners' decisions. Ipinge (2010) found that the owners, who are in most cases managers of SMEs, pay no attention to strategic planning and sustainable management principles. Moreover, Steyn and Puth (2000) also state that owner-managers, who have a strong desire to retain control of the firm, may actively place limits on shared decision making. Project manager 4 explained:

*Top management was mostly in charge of decision making. We were only consulted once decisions had already been made and we had to abide by them without asking questions. In some instances we tried to advise, but top management had pre-meditated the whole implementation project (Project manager 4).*

---

Based on the statement and literature provided, there is evidence that top management support has an impact on project management. Figure 20 shows the relationship which emerged from the analysis.



*Figure 20: Top management support has an effect on project management*

## **Discussion**

Analysis of findings shows that top managers have an important role to play in order to allow project managers to do their job effectively. Similarly, results have indicated that project management knowledge is equally important. Project management involves the use of skills and knowledge in coordinating, scheduling, and monitoring of defined activities to ensure that the stated objectives of implementation projects are achieved (Bhatti, 2005). The majority of participants agreed upon the importance of the role played by the project managers in implementing the ERP smoothly. Participants also mentioned that project managers need to be in control of the project at the same time as leading the project in the right direction.

These varying experiences show that project managers play an essential role during implementation of ERP. This is supported by Umble et al. (2003) who states that ERP implementation success cannot be achieved until end users are able to operate systems properly. For example, project manager 2 stated that some participants needed special attention due to their limited ERP knowledge. The statement below was extracted from interview data:

*Although we tried to transfer knowledge as much as we could, there was one or two users who were not very IT literate. We made sure we gave them undivided attention and involve them in each training session so they may gain skills needed to operate the system (Project manager 2).*

Based on the statement and literature provided, there is evidence that project management has an impact on team skills and commitment. The relationships which emerged are illustrated in Figure 21.



Figure 21: Project management has an impact on team skills and commitment.

Furthermore, participants asserted that project management is linked to the amount of customisation. Many potential risks related to the ERP system are dependent on how well the system can be implemented, configured, parameterised, and integrated (Grabski et al., 2001). Due to a lack of technical knowledge, both SMEs relied on the project managers to perform customisation. However, participants echoed that there was a misunderstanding between the users and project managers. The following statements were extracted from interviews:

*Customisation requirements kept on changing which led to a waste of time because the users were unsure of what they wanted to achieve with customisation (Project manager 3).*

On the other hand, participants blamed the project managers for the time and resources wasted on customisation:

*Unfortunately, the vendor team did not understand our workflow very well, so we had to explain our requirements over and over again (Supply chain analyst 2).*

The relationship which emerged between vendor support and customisation is illustrated in Figure 22.



Figure 22: Customisability is affected by project management.

## Discussion

Researchers have recognised the importance of project management and the effects it may have on ERP implementation. The majority of participants emphasised two aspects of their

---

perceptions of project management. First, participants felt that it was important for the project managers to have the required knowledge and willingness to train users. Secondly, project managers should be knowledgeable in both business processes and ERP system functions so that they can help users to perform customisation (Zhang et al., 2005). Overall, the findings indicated that some project managers were equipped with more knowledge than others.

The next section presents the analysis of IS success indicators for the ERP implementation success in South African SMEs.

### **5.3. Analysis of IS Success indicators**

This section discusses the DeLone and McLean (2003) IS success indicators for ERP implementation in South African SMEs. The review of literature had indicated that only three IS indicators influence the ERP implementation. However, the analysis of findings revealed one emerged IS indicator, namely, management support. Thus, the following four IS success indicators will be discussed - management quality, system quality, information quality, and service quality.

#### **5.3.1. Management quality**

Management quality is concerned with ways with which the organisation's management can influence the ERP implementation success. Analysis of findings demonstrated that management quality is linked to success factors such as top management support and change management.

##### ***a. Top management support***

The top management support has always proved to be one of the main factors influencing ERP implementation (Elmezziane et al., 2011). Top management support is much more than a CEO giving his or her blessings to the ERP system. Top managers are required to be willing to spend significant amounts of time serving on steering or executive committees and overseeing the implementation team (Chen et al., 2009). Intervention from management is often necessary to resolve conflict and bring everybody to the same way of thinking, and to build cooperation

among the diverse groups in the organisation (Bhagwani, 2009). Top management must act as a coach, keeping their staff motivated and in harmony (Elmeziane et al., 2011).

Participants in case A agreed that management quality was achieved through continuous support and commitment from the top manager.

*Our managing director was very committed and supportive. She made sure that all processes were operating smoothly, and she often attended training sessions, even though she was not obliged to do so (System champion 1).*

The relationship which emerged between top management support and management quality is shown in Figure 23.



Figure 23: Management quality is a result of top management support

#### ***b. Change management***

Change management has been classified as one of the most challenging tasks facing organisations when implementing new systems. This is because each and every staff member has to support the replacement of existing procedures. According to Chetcuti (2008), when organisations move to complex ERP systems, there are changes in staff commitment towards their responsibilities. This is because users are worried that their jobs might be eliminated or be changed from their usual way of doing things (Al Rashid, 2012). Change management skills are needed to support the user (Chetcuti, 2008) in order to achieve management quality. System champion 2 explained:

*Our financial manager resigned in the middle of the implementation process. This was due to the fact that he couldn't cope with all the organisational changes (System champion 2).*

Based on this statement and literature, it is arguable that management quality is a result of change management. Figure 24 illustrates the relationship which emerged.



Figure 24: Change management support has an influence on management quality

### 5.3.2. System quality

System quality is referred to as system features which allow efficient decision making while offering required system performance. Findings show that system quality has a relationship with both ERP flexibility and ERP suitability. The following section explains in detail the relationships which emerged between each relevant dominant success factor and system quality.

#### *a. ERP flexibility*

ERP flexibility is referred to as the ability of a system to adapt to changes, at the same time allowing the user to perform multiple actions in a simplified manner. From the participants' perspective, system quality can be achieved if the system provides a flexible and friendly user interface, systems integration, and ability to transfer data to different cloud storages. Logistic clerk 3 stated:

*. . . I believe the system has achieved system quality in the sense that we can view data in different formats, share information, manage and control large volume of stock easily. This has improved our performance and has helped to bring stock age down to one week (Logistic clerk 3).*

Based on the preceding statement, ERP flexibility affects system quality due to its ability to increase performance as well as productivity. Figure 25 illustrates the relationship which emerged between ERP flexibility and system quality.



Figure 25: System quality is a result of ERP flexibility

---

***b. ERP suitability***

ERP systems are complex and have a massive impact on the entire organisation (Umble et al., 2003). It is important that organisations select a suitable system which has the ability to fulfil key requirements, as well as a positive outlook on future developments (Herrera et al., 2009). Participants reported that the system quality is only achievable if the system can cater for changing environment. IT manager 1 echoed that suitability was one of the major reasons that had persuaded company A to implement a new system.

*. . . As the business environment was changing, the in-house system could not keep up with the needs of our customers. Management suggested that we implement a much more suitable system as they spotted gaps which couldn't be fulfilled unless we improve the system quality of the existing system or implement a new ERP (IT manager 1).*

Based on this statement, ERP suitability influences system quality. Figure 26 illustrates the relationship which emerged between ERP suitability and system quality.



*Figure 26: System quality is a result of system suitability*

**5.3.3. Information quality**

Information quality is referred to as the characteristics of the information that the ERP produces. Findings have shown that information quality is constituted of data accuracy and timeliness. The following section provides details which emerged between information quality, data accuracy, and timeliness.

***a. Data accuracy***

Data accuracy is considered one of the important components of information quality (DeLone & McLean, 2003). Data accuracy is referred to as the ability to report correct information from

---

a customer point of view. In instances where bad data is entered in the system, it affects all other modules – this could result to a significant financial loss. Data accuracy is characterised by the system ability to control and provide correct data. Participants stressed the importance of data accuracy in the following statement:

*. . . 99% of the data is accurate mostly because the import and export process of stock information done automatically. However, in cases where this process is done manually, the quality of information can only be achieved due to system checks, validations, and warnings which are provided when wrong data is being captured (Logistic clerk 4).*

Based on this statement, data accuracy influences information quality. This is due to its ability to provide correct data through system checks – this prevents the user from capturing incorrect data. Figure 27 illustrates the relationship which emerged between data accuracy and information quality.



*Figure 27: Information quality is a result of data accuracy*

### ***b. Timeliness***

Timeliness is one of the components of information quality. Timeliness is concerned with the ability of the system to allow quick retrieval of information. Participants expressed the importance of timeliness as it helped them to perform more work in a shorter time. The following statement was extracted from an interview:

*. . . Since the information is live, users are able to view the data in real time, they can see is what has been packed in every five minutes and they can retrieve required reports accordingly (Project manager 2).*

Timeliness is arguably one of the most important quality dimensions for information quality (Lee, Strong, Kahn, & Wang, 2002). Based on the above statement, timeliness affects

information quality due to its ability to provide required information in a timely manner. Figure 28, illustrates the relationship which emerged between timeliness and information quality.



Figure 28: Information quality is a result of timeliness

### 5.3.4. Service quality

Service quality can be explained as the overall support that the IT department or service provider offers to system users. This is applicable whether the service is provided from an internal or an external support unit. Findings of analysis found that service quality is comprised of vendor support, user training, and project management. The following section presents the relationships which emerged between service quality and relevant dominant success factors.

#### *a. Vendor support*

There is no doubt that vendor support affects the ERP implementation project. Good service and technical support to system users has an effect on users' productivity. Participants agreed that the quality of services provided by the vendor support plays a major role in their daily work. The case shows that vendor support can affect service quality.

*. . . Although the support team doesn't always give answers on time, they try to keep updating us on the progress which is nice in times of offering good service (Logistic clerk 3).*

Based on this statement, there is evidence that vendor support is linked to service quality, as illustrated in Figure 29.



Figure 29: Service quality is a result of vendor support

---

***b. Project management***

In order to deliver superior service quality, project managers should first understand how customers perceive and evaluate customer service. Project managers ought to adequately promote the services which lead towards the satisfaction of an organisation's needs. Regrettably, participants in case B claimed that some of the project managers were not adequately equipped with needed skills to deal with the implementation. Participant R declared:

*. . . There was a time where we asked a question to project manager; the question was related to some aspects of process controllers. We noticed that he was hesitant, then he told us that he will provide the answer only after he has confirmed with his superior (Participant R).*

The project management influences the service quality as it is better enhanced through knowledge, and control management of personnel distribution (Chakrabarty, Whitten & Green, 2008). Based on this statement and literature, service quality is a result of project management. Figure 30, illustrates the relationship which emerged.



*Figure 30: Project management has an effect on Service quality.*

***c. User training***

According to Kandampully (2002), user training is a key business technique that impacts on service quality delivery, customer satisfaction, sales growth, and profitability. Analysis indicates that user training has an effect on service quality. The extant literature on ERP and established business practices adopted by the majority of ERP trainers suggest that the effective implementation and operation of ERP systems require a training model to achieve better customer service for an extensive period of time (Noudoostbeni, Ismail, Jenatabadi & Yasin 2010). Figure 31 shows the relationship which emerged between user training and service quality.



*Figure 31: Service quality is a result of user training*

The next section presents the final proposed framework for SMEs' implementation success. This framework incorporates all the emerged relationships identified between dominant success factors and IS success indicators.

#### **5.4. Relationship framework for ERP implementation success**

The analysis indicates that the success of ERP implementation in South Africa is influenced by thirteen success factors. Of the thirteen, only nine factors (top management support, change management, ERP flexibility, ERP suitability, data accuracy, timeliness, vendor support, project management, and user training) have direct relationships with the four IS success indicators (management quality, system quality, information quality, and service quality). All these factors are incorporated to form relationships which lead to implementation success. Figure 32 shows a diagram with all the relationships that emerged from the findings.

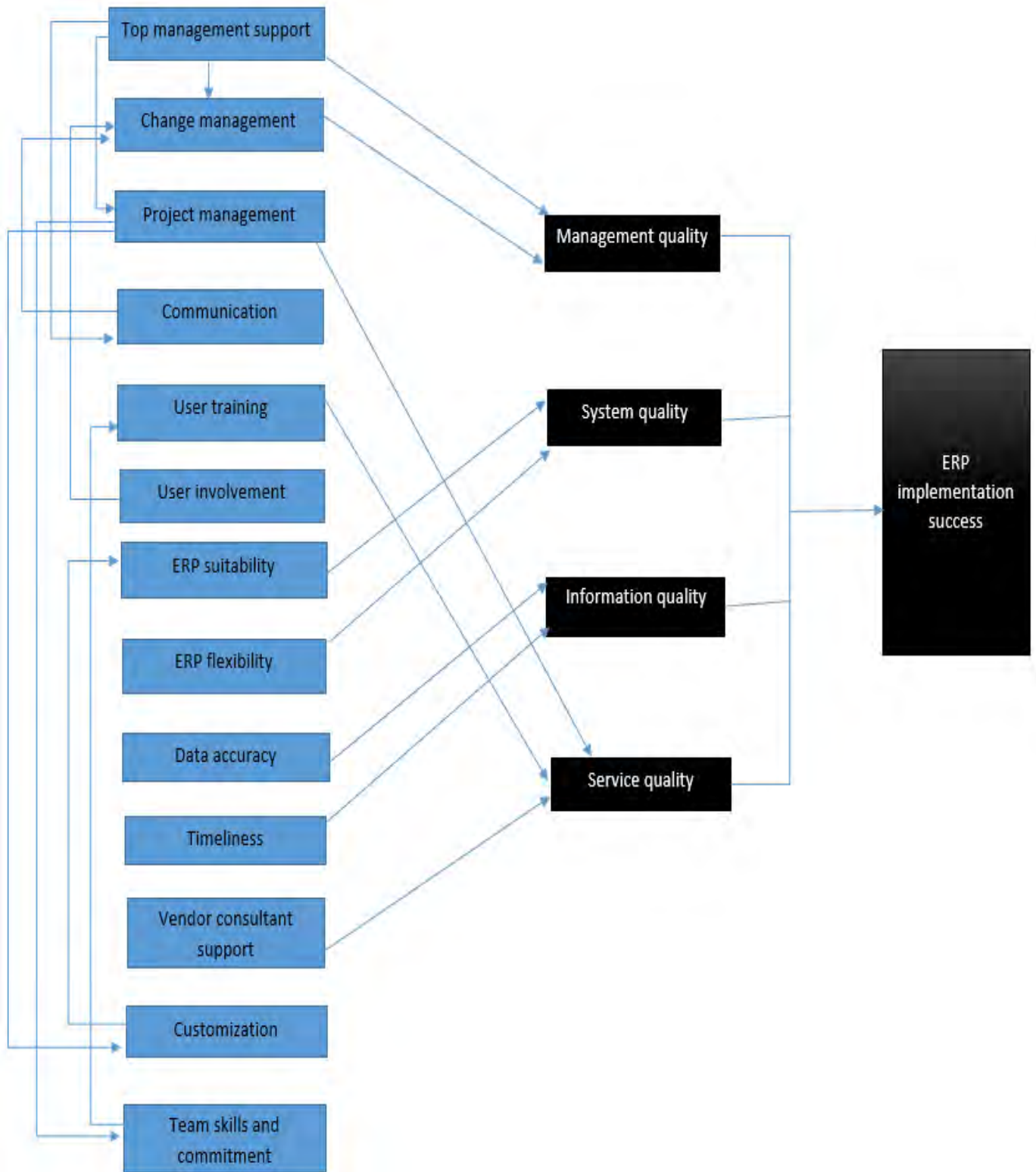


Figure 32: Relationship framework for ERP implementation success in South African SMEs

---

## **5.5. Chapter summary**

This chapter presented analysis of findings gathered from two case studies. The objective of this chapter was to confirm dominant success factors identified in the review of literature and to determine relationships which emerged between IS success indicators and success factors. Section two analysed thirteen success factors according to their respective contexts. Section three analysed all the direct relationships which emerged between indicators and nine success factors. From these findings, a relationship framework was constructed to guide South African SMEs to achieve ERP implementation success.

In the next and last chapter, conclusions will be drawn, contributions and implications will be discussed and limitations will be presented.

---

## Chapter 6. Conclusion

### 6.1. Overview

This chapter draws conclusions from the study findings while offering an understanding of the dominant success factors of ERP implementation in the context of South African SMEs. It begins by answering the research questions and research objectives that this study was meant to cover. Limitations of the research approach are then considered, followed by suggestions for significant future research.

### 6.2. Back to research questions

The aim of this study was to provide concrete conclusions and recommendations from the perspective of dominant success factors for ERP implementation in South African SMEs. Hence, this research was addressed as main research question:

1. What are the dominant success factors influencing ERP implementation in South African SMEs?

The main research question was further broken down into two sub-questions:

2. What are the IS success indicators within South African SMEs?
3. What dominant success factors have direct relationships with IS success indicators?

The next section briefly discusses how each of the research questions were addressed and where they were addressed in the thesis.

- **What are the dominant success factors influencing ERP implementation in South African SMEs?**

In an attempt to find answers to the research questions raised in this study, chapter two provided a review of literature from 2 main research areas: ERP systems and SMEs. The review of

---

literature revealed that there are thirty-two success factors. These success factors were then grouped according to the counts and meanings, which resulted into fourteen success factors. After a careful qualitative analysis and discussion was conducted in section 5.2., 13 success factors were identified to predominantly influence ERP implementation. The factors identified are: ERP flexibility, data accuracy, ERP suitability, timelines, customisability, top management support, change management, communication, project management, user training, user involvement, team composition and skills, and vendor support.

- **What are the IS success indicators within South African SMEs?**

This study employed the DeLone and McLean (2003) model to identify IS success indicators relevant to the South African context. After a review of literature conducted in developing countries, three IS success indicators (system quality, information quality and service quality) were seen to contribute to our study the most. These three indicators were chosen because other indicators such as use and intention to use, do not apply to the majority of SMEs and users are obliged to operate the ERP once it has implemented in the organisation. Additionally, user satisfaction and net benefits were not included in the conceptual framework because they are mostly achieved once the implementation has been completed.

Furthermore, after a careful analysis of data provided from interview sessions, the findings revealed one emerged IS success indicator, namely, management quality. Thus, as shown in section 5.3, the following four IS success indicators influence ERP implementation in South African SMEs: management quality, system quality, information quality and service quality.

- **What dominant success factors have direct relationships with IS success indicators?**

After analysing data from interview sessions, thirteen success factors were initially identified from the findings. The researcher established the relationships according to quotes, and statements extracted from these interviews. However, only 9 success factors were found to have direct relationships with the IS indicators. As shown in section 5.3 and 5.4, the most dominant success factors are: ERP flexibility, data accuracy, ERP suitability, timelines, top management support, change management, project management, user training, and vendor support.

---

### **6.3. Back to research aims and objectives**

The following were the objectives set to be accomplished by this study:

1. To investigate the dominant factors influencing implementation of ERP success in South African SMEs
2. To propose a conceptual model for ERP implementation success in South African SMEs using DeLone and McLean's (2003) IS success model and TOE framework
3. To validate and extend the conceptual model proposed by the study.

The following section takes a reflective view on how these objectives have been achieved. An important contribution of this research was to identify dominant success factors in South African SMEs.

Objective 1 was evaluated in chapter 2 where, through the review of literature, the research initially identified thirty two factors. Of these, fourteen success factors were selected as the most relevant success factors and the rest were categorised as group factors. The 14 dominant success factors were chosen due to the number of papers that cited them throughout the review of literature.

Objective 2 was met in chapter three where two models were selected as lenses to guide this study. The models chosen were DeLone and McLean's IS success model (2003) and Tornatzky and Fleischer's framework (1990). Each model was explained separately and was reviewed, bearing in mind the previous studies which had applied it in the context of ERP implementation. Based on dominant factors which were identified in the review of literature, the researcher combined the D&M and TOE model in order to categorise and classify the most suitable success factors for ERP implementation in South African SMEs. The conceptual theoretical framework was then provided in section 3.4.

Objective 3 was realised by moving from the conceptual to the two empirical case studies. The qualitative phase of data collection where top managers and employees were interviewed individually was reported in this study, followed by an in-depth analysis shown in chapter four.

---

The research findings showed the great importance of validating and integrating dominant success factors in the implementation process, since factors were linked to each other. Through analysis and discussion in chapter five, the best possible relationship framework for ERP implementation success in South African SMEs was illustrated in section 5.4.

#### **6.4. Contributions and direction for future research**

The contributions made by this research are various, and are in the theoretical, practical, and methodological spheres. This thesis adds value to research and practice for SMEs implementing ERP systems. Using the relationship framework for ERP implementation success provided by this study, South African SMEs predict an outcome of an ERP implementation.

Throughout the study, the researcher was mainly focused on categorising success factors into the TOE contexts. However, the study did not investigate how these contexts influence success factors. More research must be carried out to clarify this point. Additionally, it would be interesting to distinguish how different contexts affect ERP implementation success more than others. Furthermore, this study showed that some of the ERP success indicators can lead to ERP implementation success. These findings could then be used to provide insight into what similarities and differences there are in how identified success factors can affect ERP success if implemented in a controlled environment.

#### **6.5 Limitations**

The first limitation with this study is that the researcher has only focused on SMEs located in Cape Town. This means that the result from this case study could be very case specific and limited to the contexts of the SMEs examined in this study. However, since there has been limited research on this topic, this study provides valuable insight on SMEs in an implemented ERP and can be used as a valuable foundation for future research.

Secondly, since ERP systems are a contemporary subject area, the perceived benefits of these systems are likely to undergo changes and become more specialised as technology vendors bring to the market a variety of systems or components designed for particular purposes.

---

Therefore, this research provides an overview of the effect of ERP systems at only a specific stage in time.

Thirdly, the use of SMEs' staff in interviews was regarded suitable, simply because the information needed for the ERP implementation process was qualitative in nature and complicated, if not unachievable, to gather objectively. Though interviews were in person in a closed room, some interviewees seemed reluctant to provide full answers, especially when asked to specify whether top management was supportive or not.

Nevertheless, in spite of these limitations, this research study makes an important contribution to theory and practice, because there is a lack of studies conducted to address the issue that ERP implementation projects encounter, especially in South African SMEs.

---

## References

- Abbas, A., Mudassar, M., Gul, A. & Madni, A. (2013). Factors contributing to job satisfaction for worker in Pakistani organisation. *International Journal of Academic Research in Business and Social Science*, 3 (1), 525-544.
- Abdalla, S. (2012). *An e-government adoption framework for developing countries: A case study from Sudan*. (Unpublished Doctoral). School of applied sciences, Cranfield University. Retrieved from <http://dspace.lib.cranfield.ac.uk/handle/1826/7314>
- Abor, J., & Quartey, P. (2010). Issues in SME development in Ghana and South Africa. *International Research Journal of Finance and Economics*, (39), 219-231.
- Ahmad, M. M., & Cuenca, P. R. (2013). Critical success factors for ERP implementation in SMEs. *Robotics and Computer-Integrated Manufacturing*, 3 (8), 104-111.
- Ahmed Butt, M., & Zaman, M. (2012). Legacy information system development: Problems and issues. *International Journal of Computers and Distributed Systems*, 2(1), 114-117.
- Ahmed, A., & Khan, M. K. (2013). Identification of critical success factor during ERP implementation. *International Journal of Science and Applied Information Technology (IJSAIT)*, 2(2), 12-17.
- Al Rashid, W. (2012). Exploring enterprise resource planning (ERP) implementation from stakeholder perspective – a case study. *The 5th International Conference on Communications, Computers and Applications*, Istanbul, Turkey. 125-130.
- Althonayan, M. (2013). *Evaluating stakeholders' performance of ERP systems in Saudi Arabia higher education* (Doctorate). Retrieved from <http://bura.brunel.ac.uk/handle/2438/7502>
- Amoako-Gyampah, K. & Salam, A.F. (2004). “An extension of the technology acceptance model in an ERP implementation environment”, *Information & Management*, 41(6) 731-745.
- Angeles, R. (2013). Using the technology-organisation-environment framework and Zuboff's concepts for understanding environmental sustainability and RFID: Two case studies.

---

*Engineering and Technology International Journal of Social, Education, Economics and Management Engineering*, 7(11), 1599-1608.

Anney, V. N. (2014). Ensuring the quality of the findings of qualitative research: Looking at trustworthiness criteria. *Journal of Emerging Trends in Educational Research and Policy Studies*, 5, 272-281.

Averweg, R., & Erwin, G. (2000). Critical success factors for implementation of decision support systems in South Africa. *Proceedings of the 32nd Hawaii International Conference on System Sciences*, 3, 1-10.

Bailey, J. E., & Pearson, S. W. (1983). Development of a tool for measuring and analyzing computer user satisfaction. *Management Science*, 29(5), 530-545.

Barney, J., B. (1986). Organisation culture: Can it be a source of sustained competitive advantage? *The Academy of Management Review*, 11(3), 656-665.

Bhagwani, A. (2009). *Critical success factors in implementing SAP ERP software*. (Unpublished Master of Science). University of Kansas, EMGT Field Project report. Retrieved from <https://kuscholarworks.ku.edu/handle/1808/5910>

Bharati, P., & Chaudhury, A. (2004). An empirical investigation of decision-making satisfaction in web-based decision support systems. *Decision Support Systems*, 37, 187-197.

Bhatti, T., R. (2005). Critical success factors for the implementation of enterprise resource planning (ERP): Empirical validation. *The Second International Conference on Innovation in Information Technology*, 1-10.

Braun, V., & Clarke, V. (2006). "Using thematic analysis in psychology". *Qualitative Research in Psychology*, 3(2), 94.

Brink, D., Roos, L., Weller, J., & Van Belle, J. P. (2006). Critical success factors for migrating to OSS-on-the-desktop: Common themes across three South African case studies. *International Federation for Information Processing*, 203, 287-293.

- 
- Bulkelery, W., M. (1996). *A cautionary network tale: Fox-Meyer's high-tech gamble*. (Wall Street Journal Interactive Edition).
- Burrell, G., & Morgan, G. (Eds.). (1979). *Sociology paradigms and organisational analysis: Elements of the Sociology of corporate life*. London: Heinemann Publishers.
- Chakrabarty, S., Whitten, D., & Green, K. W. (2008). Understanding service quality and relationship quality in IS outsourcing: Client orientation & promotion, project management effectiveness, and the task-technology-structure fit. *Journal of Computer Information Systems*, 48(2), 1-15.
- Chen, H., Chen, S., & Tsai, L. (2009). A study of successful ERP – from the organisation fit perspective. *Systemic, Cybernetics and Informatics*, 7(4), 8-16.
- Chetcuti, H. (2008). ERP implementation: A multi-stakeholder analysis of critical success factors. *WICT Proceedings*, 1-6.
- Cloete, E., Courtney, S., & Fintz, J. (2002). Small businesses' acceptance and adoption of e-Commerce in the Western-Cape Province of South Africa. *The Electronic Journal of Information Systems in Developing Countries*, 10.
- Creswell, J. (2003). *Research Design: Qualitative, Quantitative and mixed Methods Approaches* (pp. 1-26): International Educational and Professional Publisher.
- Christofi, M., Nunes, M., Chao Peng, G., & Lin, A. (2013). Towards ERP success in SMEs through business process review prior to implementation. *Journal of Systems and Information Technology*, 15(4), 304-323.
- Crotty, M. (Ed.). (1998). *The foundations of social research: Meaning and perspective in the research process*. London: SAGE Publications.
- Davenport, T., H. (1998). Putting the enterprise into the enterprise system. *Harvard Business Review*, 76(4), 121-131.
- Dawson, L., & Van Belle, J., P. (2013). Critical success factors for business intelligence in the South African financial services sector. *SA Journal of Information Management*, 15(1), 1-12.

- 
- De Brito, M., & Van der Laan, E. (2010). Supply chain management and sustainability: Procrastinating integration in mainstream research. *Sustainability*, 2, 859-870.
- De Jager, D. C. (2010). *ERP value determination in South African companies* (Master of business Administration). Retrieved from <http://hdl.handle.net/2263/23780>
- DeLone, W., & McLean, E. (1992). Information systems success: The quest for the dependent variable. *Information Systems Research*, 3(1), 60-65.
- DeLone, W., & McLean, E. (2003). The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems*, 19(4), 9-30.
- Dezdar, S., & Ainin, S. (2011). Critical success factors for ERP implementation: Insights from a middle-eastern country. *Middle-East Journal of Scientific Research*, 10(6), 798-808.
- Dlodlo, B. J. (2011). *Enterprise resource planning in manufacturing SMEs in the Vaal Triangle*. (Master in Business Administration). (Campus of the North-West University Potchefstroom, Potchefstroom).
- Edlund, S., Lövquist, A., & Nilsson, G. (2012). *The role of system administrators in information systems success* (Master in Social Science). (Uppsala University). Retrieved from <http://urn:nbn:se:uu:diva-176138>
- Egan, M., T. (2002). *Grounded theory research and theory building advances in developing human resources*. SAGE Publications.
- Eisenhardt, K., M. (1989). Building theories from case study research. *Academy of Management Review*, 14(4), 532-550.
- Elmeziane, K., Chuanmin, S., & Elmeziane, M., (2011). The importance of critical success factors of enterprise resources planning implementation in China. *Business Management Dynamics*, 1(6), 1-10.
- Esteves de Sousa, J. (2007). *Definition and analysis of critical success factors for erp implementation projects*. (Doctorate). Universitat Politècnica de Catalunya, Barcelona, Spain. Retrieved from <http://www.profesores.ie.edu/jmesteves/amcis200.pdf>

- 
- Esteves, S., & Pastor, C. (2000). Towards the unification of critical success factors for ERP implementations. *10th Annual Business Information Technology (BIT) 2000 Conference, Manchester*, 1-9.
- Esteves, J., & Pastor, J. (2001). Analysis of critical success factors relevance along SAP implementation phases. *Seventh Americas Conference on Information Systems*, 1019-1025.
- Falkena. (2001). Financial regulations in South Africa. *SA Financial Sector Forum*, 11-20.
- Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods*, (5) 1–11.
- Fida B.A (2008). The Role of Small and Medium Enterprises (SMEs) in Economic Development. Enterprise Development, Free Online Library, December.
- Finger, G. (2005). An investigation into the implementation of enterprise Resource planning by SA ICT operators. *Management Information Systems Quarterly*, 1(11), 1-12.
- Gal, M., D., Borg, W., R., & Gal, J., P. (Eds.). *Educational research: An introduction White Plains, Longman*. (6th ed.). New York: White Plains.
- Galliers, R., D. (Ed.). (1992). *Choosing information systems research approaches*. Oxford: Blackwell Scientific.
- García-Sánchez, N., & Pérez-Bernal, L. (2007). Determination of critical success factors in implementing an ERP system: A field study in Mexican enterprises. *Information Technology for Development*, 13(3), 293-309.
- Gebauer Judith, L. F. (2008). Enterprise system flexibility and implementation strategies: Aligning theory with evidence from a case study. *Information Systems Management*, 25(1), 72-82.
- Ghaffar, A., & Azim, M. (2010). Significant factors influencing ERP in large organisation, evidence from Egypt. *European Mediterranean & Middle Eastern Conference on Information Systems*, (16), 1-7.

- 
- Ghosh, R. (2012). A comprehensive study on ERP failures stressing on reluctance to change as a cause of failure. *Journal of Marketing and Management*, 3(1), 123-134.
- Gibson, M. D. (2012). *Critical success factors for the implementation of an operational risk management system for South African financial services* (Master of Commerce). (University of South Africa). Retrieved from <http://hdl.handle.net/10500/5967>
- Gibson, T., & Van der Vaart, H. J. (2008). A less imperfect way of defining small and medium enterprises in developing countries. *Brookings Global Economy and Development*, 5, 1-29.
- Goffman, E. (Ed.). (1959). *The presentation of self in everyday life*. Garden City, New York: Doubleday Anchor Books.
- Gong, Y., & Janssen, M. (2012). From policy implementation to business process management: Principles for creating flexibility and agility. *Government Information Quarterly*, 29, 61-71.
- Grabski, S., Leech, S., & Lu, B. (2001). Risks and controls in the implementation of ERP systems. *The International Journal of Digital Accounting Research*, 1(1), 47-68.
- Griffith, T. L., Zammuto, R. F., & Aiman-Smith, L. (1999). Why new technologies fail: Overcoming the invisibility of implementation. *Industrial management*, 41(3), 29-34.
- Hanning, L., E. (2010). *The role of change management in successfully implementing a retail enterprise resource planning solution*. (Master in Business Administration). (University of Pretoria) Retrieved from <http://hdl.handle.net/10500/3982>
- Hart, C., A. (2010). The organisational performance impact of ERP systems on selected manufacturing companies within South Africa. *South African Journal of Industrial Engineering*, 25(1), 14-28.
- Heeks, R., & Hawari, A. (2010). Explaining ERP Failure in a Developing Country: A Jordanian case study. *Journal of Enterprise Information Management*, 2(23), 135-160.

- 
- Herrera, F., Herrera, E., Viedma, P. J., Sánchez, A., & Martínez, L. (2009). A fuzzy model to evaluate the suitability of installing an enterprise resource planning system. *Information Sciences, 179*, 2333-2341.
- Holloway, I. (Ed.). (1997). *Basic concepts for qualitative research*. London: Black Science.
- Huang, Z., & Palvia, P. (2001). ERP implementation issues in advanced & developing countries. *Business Process Management Journal, 7*(3), 276-284.
- Ifinedo, P., & Nahar, N. (2006). Prioritization of enterprise resource planning (ERP) Systems success measures: Viewpoints of Two Organisational stakeholder groups. *SAC, 1555-1562*.
- Ipinge, A., (2010). An analysis of the development of small and medium enterprises in Namibia - Khomas region (Master of Business Administration). Retrieved from <http://hdl.handle.net/10019.1/952>
- Ishak, N. M., & Bakar, A. A. (2012). Qualitative data management and analysis using NVivo: An approach used to examine leadership qualities among student leaders. *Education Research Journal, 2*(3), 94-103.
- Joubert, W. (2002). *Defining the critical success factors for the implementation and maintenance of a total quality management system in South African construction companies involved in building* (Master of Science). (University of Pretoria). Retrieved from <http://hdl.handle.net/2263/27573>
- Kale, P., Banwait, S., & Laroia, C. (2009). Enterprise resource planning implementation in Indian SMEs: Issues and challenges. *National Institute of Technical Teachers' Training and Research, 242-248*.
- Kalema, B. M., Olugbara, O., & Kekwaletswe, R. (2014). Identifying critical success factors: The case of ERP systems in higher education. *The African Journal of Information Systems, 6*(3), 65-84.

- 
- Kambarami, L., Mhlanga, S., & Chikowore, T. (2012). Evaluation of enterprise resource planning implementation success: Case study in Zimbabwe. *CIE42 Proceedings, Cape Town, South Africa*, 1-15.
- Kandampully, J. (2002). Innovation as the core competency of a service organisation: the role of technology, knowledge and networks, *European Journal of Innovation Management*, (5)1, 18 - 26
- Khattaka, M., Yuanguana, S., Irfana, M., Khattakb, A., & Shoaib, M. (2012). Examining critical success factors affecting ERP implementations in enterprises of Pakistan. *Interdisciplinary Journal of Contemporary Research in Business*, 3(10), 1-27
- Klaus, T., Wingreen, S. and Blanton, J.E. (2007). “Global business environment: management challenges: examining user resistance and management strategies in enterprise system implementations”, *Proceedings of the 2007 ACM SIGMIS CPR Conference on Computer Personnel Research: The Global Information Technology Workforce (SIGMIS-CPR’07)*, ACM, New York, NY, 55-62
- Klein, H. K., & Myers, M., D. (1999). A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS Quarterly*, 23(1), 67-93.
- Kohlbacher, F. (2006). The use of qualitative content analysis in case study research. *Forum: Qualitative Social Research*, 7(1), 1-30.
- Kronbichler, S., Ostermann, H., & Staudinger, R. (2009). A review of critical success factors for ERP-projects. *The Open Information Systems Journal*, 3(14), 25.
- Kumar, P. (2010). Successful implementation of ERP in a large organisation. *International Journal of Engineering Science and Technology*, 2(7), 3218-3224.
- Kvale, S. (2007). *Doing interviews*. Thousand Oaks, CA: SAGE Publications.
- Lee, Y., Strong, D., Kahn, B., & Wang, R. (2002). AIMQ: A methodology for information quality assessment. *Information & Management*, 40(2002), 133-146.
- Levin, K. (2006). Study design III: Cross-sectional studies. *Evidence-Based dentistry*, 7, 24-25

- 
- Markus, & Tanis. (2004). The enterprise system experience-from adoption to success. *Pinnaflex Educational Resources*, 173-207.
- Marshall, C. & Rossman, G. B. (1999). *Designing Qualitative Research* (3rd ed.). Thousand Oaks, California: Sage
- Marshall, S., & Taylor, W. (2014). Critical success factors for ICT usage in learning. *International Journal of Education and Development using Information and Communication Technology*, 10(1), 2-3.
- Mathiassen, L., Conboy, K., & Fitzgerald, G. (2012). Qualitative methods research in information systems: Motivations, themes, and contributions. *European Journal of Information Systems*, 21, 113-118.
- Merriam, S. B. (1995). Issues of validity and reliability in qualitative research. *PAACE Journal of Lifelong Learning*, 4, 51-60.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. Sage.
- Moohebat, M., Davarpanah, J., M. (2010). A comparative study of critical success factors (CSFs) in implementation of ERP in developed and developing countries. *International Journal of Advancements in Computing Technology*, 2(5), 99-111.
- Mukwasi, C., & Seymour, L. (2012). Enterprise resource planning business case considerations: A enterprise resource planning business case review for small and medium-sized enterprises. *Journal of Innovation Management in Small & Medium Enterprises*, (2012), 1-15.
- Mushavhanamadi, K., & Mbohwa, C. (2013). The impact of enterprise resource planning system (ERP) in a South African company. *International Journal of Social, Education, Economics and Management Engineering*, 7(11), 1624-1628.
- Mutongwa, M., & Rabah, K. (2011). ERP system solutions for small and medium enterprises in Trans - Nzoia County – Kenya. *Journal of Emerging Trends in Computing and Information Sciences*, 4(11), 869-877.

- 
- Myers, M. D., & Newman, M. (2007). The qualitative interview in IS research: Examining the craft. *Information and Organisation* 17 (2007) 2–26, 17, 2-26.
- Nelson, K. (2005). Exploring emotions during ERP adoption: A stakeholder analysis. *Proceedings of the 38th Hawaii International Conference on System Sciences*, 1-9.
- Northcutt, N., & McCoy, D. (2004). *Interactive qualitative analysis*. Thousand Oaks: SAGE Publications.
- Noudoostbeni, A., Ismail, N.A., Jenatabadi, H.S., & Yasin, N. M. (2010). “An effective end-user knowledge concern training method in enterprise resource planning (ERP) based on critical factors (CFs) in Malaysian SMEs”, *International Journal of Business and Management*, 5(7), 63-76.
- O’Donovan, B., Seymour, L., Geldenhuys, J., Isaacs, M., & Kaulule, K. (2010). The influence of organisational memory mismatches and coping strategies on ERP outcomes. *The Electronic Journal Information Systems Evaluation*, 13(2), 165-176.
- Odhiambo, J. (2010). *Enterprise resource planning systems implementation and upgrade*. (Doctoral of Philosophy). Middlesex University, School of Engineering and Information Sciences. Retrieved from <http://eprints.mdx.ac.uk/id/eprint/6458>
- Petter, S., & McLean, E. (2008). A meta-analytic assessment of the DeLone and McLean IS success model: An examination of IS success at the individual level. *Information & Management*, (46), 159-166.
- Rabaa’i, A. (2009). Identifying critical success factors of ERP systems at the higher education sector. *Third International Symposium on Innovation in Information & Communication Technology*, 1-17.
- Rajapakse, & Seddon. (2005). Why ERP may not be suitable for organisations in developing countries in Asia. *Proceeding of Information Systems Research Seminar in Scandinavia-IRIS*, 1382-1388.

- 
- Ramburn A., & Seymour L. (2014). Key knowledge challenges impacting an ERP implementation in an emerging economy context. *Journal of South African Business Research*, 2014, 1-11.
- Ramburn, A., Seymour, L., & Gopaul, A. (2014). Learning from a failed ERP implementation: The case of a large South African organisation. *Journal of South African Business Research*, 1-10.
- Raymond, L. (1990). Organisational context and information systems success: A contingency approach. *Journal of Management Information Systems*, 6(4), 5-20.
- Remenyi, D., Williams, B., Money, A., & Swartz, E. (2003). *Doing research in business and management: An introduction to process and method* London, SAGE Publications.
- Rockart, J. (1979). Chief executives define their own information needs. . *Harvard Business Review*, 81-92.
- Roisin, M., Chatzichristos, C., & Federico, I. (2011). An empirical study of ERP implementation, in small and medium enterprises in Greece. *8th International Conference on Enterprise Systems, Accounting and Logistics*, 1-28.
- Sabherwal, R., Jeyaraj, A., & Chowa, C. (2006). Information System Success: Individual and organisational determinants. *Management Science*, 52(12), 1849-1864.
- Salhotra, E. (2014). *Stakeholder salience in ERP projects* (Master in Information Technology). (University of Tampere). Retrieved from <http://urn.fi/URN:NBN:fi:uta-201410282261>
- Sanchez, N., G. & Perez-Bernal, L., E. (2007). Determination of critical success factors in implementing an ERP system: A field study in Mexican enterprises. *Information technology for development*, 13(3), 293-309.
- Saunders, M., Lewis, P., & Thornhill, A. (Eds.). (2007). *Research methods for business students*. (6th ed.). London: Pearson.
- Scholtz, B., & Atukwase, D. (2016). An Analysis of the Perceived Benefits and Drawbacks of Cloud ERP Systems: A South African Study. In *Information Technology in Environmental Engineering* (pp. 75-87). Springer International Publishing.

- 
- Schlichter, B., R., & Rose, J. (2013). Trust dynamics in a large system implementation: Six theoretical propositions. *European Journal of Information Systems*, 22, 455-474.
- Schniederjans, D., & Yadav, S. (2013). Successful ERP implementation: An integrative model. *Business Process Management Journal*, 19, 364-398.
- Seddon, P. B. (1997). A respecification and extension of the DeLone and McLean model of IS success. *Information Systems Research*, 8(3), 240-253.
- Sedera, D., & Dey, S. (2006). Multi-stakeholder assessment of critical success factors: Insights from the world's fastest SAP R/3 implementation. *AMCIS 2006 Proceedings*. Paper 303
- Shah, S. I., Khan, Z., Abdul, Bokhari, R., & Raza, A. M. (2011). Exploring the impediments of successful ERP implementation: A case study in a public organisation. *International Journal of Business and Social Science*, 2(22), 289-296.
- Singh, A., & Wesson, J. (2009). Evaluation criteria for assessing the usability of ERP systems. *South African Institute of Computer Scientist and Information Technologist*, 12(14), 87-96.
- Smuts, H., Van der Merwe, A., Looock, M., & Kotze, P. (2010). Critical success factors for information systems outsourcing management: A software development lifecycle view. *Proceedings of the 2010 Annual Research Conference of the South African Institute of Computer Scientists and Information Technologists*, 1-10.
- Snider, B., da Silveira, G., & Balakrishnan, J. (2009). *ERP implementation at SMEs: Analysis of five Canadian cases*. *International Journal of Operations & Production Management*, 29(1), 4 – 29.
- Somers, T., & Nelson, C. (2004). A taxonomy of players and activities across the ERP project life cycle. *Information & Management*, 41(3), 257-278.
- Sritharan, S. (2006). *A stakeholder perspective of enterprise systems implementation: A case study of a university's enterprise resource planning project*. (Master of Science). National University of Singapore.

- 
- Stake, R. (2000). In Denzin N., Lincoln Y. and Lincoln Y. (Eds.), *Handbook of qualitative research* (2nd ed.). Thousand Oaks: SAGE Publications
- Steyn, B., & Puth, G. (2000). *Corporate communication strategy*. Sandown: Heinemann Publishers.
- Strauss, A., & Corbin, J. (1990). *Basics of qualitative research: Grounded theory procedures and techniques*. Newbury Park, CA: Sage Publications.
- Swain, S. (2013). Stakeholder management in SAP implementation projects. *Project Management Institute*, 1-5.
- Tenkorang, & Helo. (2011). Enterprise resource planning (ERP): A Review Literature report. *Proceedings of the World Congress on Engineering and Computer Science*, 2, 19-21.
- Ter Chian, F. (2010). A perception-based model for technological innovation in small and medium enterprises. *18th European Conference on Information Systems*, 1-13.
- Thakkar, J., Kanda, A., & Deshmukh, S. (2009). Supply chain performance measurement framework for small and medium scale enterprises. *An International Journal*, 16(5), 702-723.
- Tongco, Maria, Dolares, C. (2007). Purposive sampling as a tool for informant selection. . *Ethnobotany Research & Applications*, 5, 147-158.
- Torkzadeh, G., & Doll, W. J. (1999). The development of a tool for measuring the perceived impact of information technology on work. *The International Journal of Management Science*, (27), 327-339.
- Tornatzky, L., & Klein, K. (1982). Innovation characteristics and innovation adoption-implementation: A meta-analysis of findings. *IEEE Transactions on Engineering Management*, 29(1), 28-45.
- Tornatzky, L. G., & Fleischer, M. (Eds.). (1990). *The processes of technological innovation*. (Lexington Books ed.). Lexington, Massachusetts.

- 
- Tourangeau, R., & Yan, T. (2007). Sensitive questions in surveys. *Psychological Bulletin of American Psychological Association*, 133(5), 859-883.
- Umble, E., Haft, R., & Umble, M. (2003). Enterprise resource planning: Implementation procedures and critical success factors. *European Journal of Operational Research*, 146, 241-257.
- Van Dyk, F., E., & Maspero, E. (2004). An analysis of the South African fruit logistics infrastructure. *CSIR*, 20(1), 55-72.
- Van Schalkwyk, P. G., & Lotriet, H. H. (2011). Web 2.0- support for change management during BPMS implementation using an open source approach. *South African Journal of Industrial Engineering*, 22(2), 161-174.
- Van Vuuren, J. (2002). *Environmental scanning- A South African corporate communication perspective with special emphasis on the tertiary sector*. (DPhil in Communication Management), University of Pretoria. Retrieved from <http://hdl.handle.net/2263/27444>
- Van Wyk, E. (2011). Applying lean thinking to the fresh produce industry. Retrieved July 21, from [www.foodchaincentre.com](http://www.foodchaincentre.com)
- Venkatesh, V., Brown, S. A., & Bala, H. (2013). Bridging the qualitative–quantitative divide: guidelines for conducting mixed methods research in information systems. *MIS Quarterly*, 37(1), 21-54.
- Venkatesh, V., Brown, S. A., & Bala, H. (2013). Bridging the qualitative–quantitative divide: guidelines for conducting mixed methods research in information systems. *MIS Quarterly*, 37(1), 21-54.
- Walsham, G. (2006). Doing interpretive research. *European Journal of Information Systems* (2006) 15, 320–330, 15, 320-330.
- Pitt, L., Watson, R., & Kavan, B. (1998). Measuring Information Systems Service quality: Lesson from Two Longitudinal case studies. *MIS Quarterly*.
- Wong, A., Scarbrough, H., Chau, P., & Davison, R. (2005). Critical failure factors in ERP implementation. (29), 1-14.

- 
- Yin, R. (2004). Case study methods. In G. Camilli (Ed.), *Complementary methods for research in education* (3rd edition ed., pp. 1-26). Washington, DC: American Educational Research Association.
- Yin, R. K. (2009). *Case study research: Design and methods* (4th Ed.). Thousand Oaks, CA: Sage.
- Yusufa, Y., & Abthorpe, M. (2005). Enterprise information systems project implementation: A case study of ERP in Rolls-Royce. *Int. J. Production Economics*, (87), 251-266.
- Zhang, Z., Lee, M., Huang, P., Zhang, L., & Huang, X. (2005). A framework of ERP systems implementation success in china: An empirical study. *International Journal of Production Economics*, 98(1), 56-80.
- Zhang, L., Lee, M., Zhang, Z., & Banerjee, P. (2003). Critical success factors of enterprise Resource Planning systems implementation success in china. *Proceedings of the 36th Hawaii International Conference on System Sciences*, (5) 1-10.
- Zhu, K., & Kraemer, K. (2005). Post-adoption variations in usage and value of E-business by organisations: Cross-country evidence from the retail industry. *Information Systems Research*, 16(1), 61-84.
- Ziemba, E., & Oblak, I. (2013). Critical Success Factors for ERP Systems Implementation in Public Administration. *Interdisciplinary Journal of Information, Knowledge, and Management*, (8) 2-19.

---

## APPENDIX A: INTERVIEW QUESTIONS AND SAMPLE OF PARTICIPANTS' RESPONSES.

(...) [Some text removed]

### a. Background information

1. Full name:
2. Official appointment:
3. Number of years having held this appointment:
4. Contact information:

### b. Open ended questions

Please note that questions are categorized according to the roles and responsibilities of the interviewee.

#### I. IMPLEMENTATION (MANAGEMENT QUALITY)

- What were your roles and responsibilities when the ERP project was being implemented?

The first part is to get to know the client.

- In what ways do you think you affected the project?

I was in charge of planning the project.

- During the implementation, how would you define the awareness and commitment of top management to the project?

Their attitude was very positive, very supportive.

- How was the process of customization done?

There weren't major changes to the actual system.

- In your opinion, do you have enough staffs with adequate ICT skills?

Yes. (...) [Some text has been removed for confidentiality purposes]

- How did timing and budget of the project implementation affect the completion of the project?

I will have check with my superior to make sure of that. (...) [Some text has been removed for confidentiality purposes]

- Do you think training was done adequately? How?

---

Systems champions were only able to start training other users after the first season was finished.

- Do users need continuous training on how to find, understand and access their corporate data?

Users still do training even in post implementation. (...) [Some text has been removed for confidentiality purposes]

- Has the user accounted a situation where they were not able to get a turnaround on their request for reports and data?

Yes, not all information was on all the reports they were using. (...) [Some text has been removed for confidentiality purposes]

- How effective was communication managed between top management and users?

The director gave instructions which were clear of what he wanted to do, because he is very hands-on of the system expectation. So he would call everyone and draw a picture of what needs to be done. In the meetings he included the users, system champion and I the consultant vendor.

- What do you think were the major barriers while implementing the ERP system?

Indecivness internally on their side as to how they wanted to operate as a business in the export industry. [Some text has been removed for confidentiality purposes]

- What is the future plan for the project?

There is constant changes and updates on the project. There is integration to include all the financial details on the system.

## II. SYSTEM QUALITY

- Please explain how the ERP project has (or has not) positive impact on the productivity of the user's job?

Definitely positive, the main thing that this system does it to make thing done a lot easier in a small time since what we specialize in.

- Which of the ERP system characteristics you consider significantly to enhance user's performance?

Having a global view of the entire system at the same time having a clear of the history of your data from what happened from day one until now which keeps track of the income and better visibility.

- Please explain how the quality of ERP affects the user's performance?

- 
- How accurate is the data the user uses for their purposes on the job?

The data is live, basically they receive data daily and what they see is what have been packed like ten minutes or 5 minutes ago, so it is very accurate since it a live system.

- How difficult or unexpected inconsistencies does the user find when it is necessary to compare or aggregate from two or more different sources?

There could be hiccups since sometimes there is bugs in the system or user errors when the clients are entering data but I think mostly the system is quite accurate

- How adequate would the user describe the ERP system?

Very adequate as we have over 60 client in the export industry, working on the same system. I don't think we would have so many if we were not that good.

- Please comment on the effectiveness or ineffectiveness of the ERP project for instance in cases where the user are able/unable to find the data that they need.

Particularly, in this case the client have two system champions, one doing logistics and the other involved in finance.

- How does the system allow quick information retrieval?

There is quick retrieval of information since don't even have to be in the system to retrieve information, you just be on the desktop and be able to get the information you need.

- How is the output format presented?

In cases where they need changes they need to tell me how the format of the new report should be presented and where the information on report field comes from in the system.

- How often does the user get the information they require on time? Example?

I would say 99% of the time unless in cases there is user error

- How easy/hard is it for the user to learn the ERP system? (Timeline)?

I think if you are familiar with the industry, it's easier. (...) [Some text has been removed for confidentiality purposes]

- What positive impacts does the ERP system have on the user's productivity of the job?

I think it actually boosts their productivity, because a lot of the logic is done by the system

- How important would the user classify the ERP system to be an aid for their job? And why?

Very good. Very important

- Please explain how the EPR system allows the user to accomplish more work that would otherwise be possible?

---

With any other system, the user would have to need to do the formatting and filtering of the data themselves but in this case the system is suited to do this automatically in a format that is easy to read.

- In which ways does the system enhance the user's awareness? How easy/hard is the user able to detect errors?

It's usually quite easy because the system has certain screens and processes in place to detect error, for instance the control validation screen which tells stops the user and tells them the issues with the data they enter in the system.

- How easy/difficult is it to find solutions to problems in the system? (logs)

It depends from problem to problem, for example it mainly depends on the data the client receives. If the data is not accurate enough, then the user will have to perform a few actions manually to ensure that the data is correct.

### **III. SERVICE QUALITY**

- In your opinion, do you think the support team gives quick service to users? How? Yes, the user dictates the priority of the problem and the support team solves it according to that priority.

- Does the support team have the knowledge to do their job well?

Yes they do

- Please comment on the reliability of support team to give right answers to the users' queries?

Yes. (...) [Some text has been removed for confidentiality purposes]

---

## APPENDIX B: COVER LETTER



Department of Information Systems  
Leslie Commerce Building  
Engineering Mall, Upper Campus  
OR Private Bag, Rondebosch, 7701  
Tel: +27 (0) 21 650 4670 Fax: +27 (0) 21 650 2280  
Internet: [www.uct.ac.za](http://www.uct.ac.za)

---

Dear <recipient name>,

This email serves as a request for permission to interview you as part of my empirical research. I am a postgraduate student from the Department of Information Systems at the University of Cape Town. I am conducting an empirical research project as part of my Master's degree.

The research topic is "ERP implementation success framework for developing countries: Case of South African SMEs". I am aiming to investigate dominant success factors which impact success of ERP implementation in South African SMEs. Additionally, I am aiming to establish the relationships between these factors and IS success indicators. The interview process will take maximum of 45 minutes to complete. I believe that this research will be valuable to both academic institutions and organisations planning or in process of implementing ERP projects.

The findings of this research study will be compiled in a report that will be presented to the University of Cape Town for academic purposes. Participants' details will not be published as part of the report and all participants will remain anonymous. Should you have any questions on the research feel free to contact me on the below contact details.

Your participation in this research will be greatly appreciated. Participation is entirely voluntary and all information will be treated confidentially and used solely for the purpose of this study.

Thank you for your time and participation. I look forward to meeting you.

Yours faithfully,

---

Gloria IRAKOZE

+27780340432

[irkglo001@myuct.ac.za](mailto:irkglo001@myuct.ac.za)

Supervised by:

Professor Lisa Seymour

[lisa.seymour@uct.ac.za](mailto:lisa.seymour@uct.ac.za)

---

## **APPENDIX C: CONSENT FORM**

### **Participant Consent Form**

I, \_\_\_\_\_, consent to participate and be interviewed for the purpose of this research study.

I am aware that participation is voluntary and that I may choose to withdraw from this study at any time or not answer a specific question if I so wish.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

---

## APPENDIX D: ETHICS APPROVAL LETTER

UNIVERSITY OF CAPE TOWN



---

**Faculty of Commerce  
Ethics in Research Committee**

Courier: Room 2.21 Leslie Commerce Building Upper Campus University of Cape Town  
Post: University of Cape Town □ Private Bag □ Rondebosch 7701  
Email: Irwin.brown@uct.ac.za  
Telephone: +27 21 650-2311  
Fax No.: +27 21 689-7570

January 24, 2015

Gloria IRAKOZE  
Information Systems

**Project title:** *ERP implementation success framework for developing countries: Case of South African SMEs*

Proposal no. 10-2015

Dear Researcher,

This letter serves to confirm that this project as described in your submitted protocol has been approved.

Please note that if you make any substantial change in your research procedure that could affect the experiences of the participants, you must submit a revised protocol to the Committee for approval.

Regards,

Professor Harold Kincaid

Signature Removed

Commerce Faculty Ethics in Research Committee