E-COMMERCE INFORMATION SYSTEMS (ECIS) SUCCESS: A SOUTH AFRICAN STUDY

by

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Thesis

submitted in fulfilment of the requirements for the degree

Doctor Technologiae

in

Information Technology

in the

Faculty of Informatics and Design

at the

CAPE PENINSULA UNIVERSITY OF TECHNOLOGY

Supervisor: Prof. D. Remenyi

November 2006
DECLARATION

I, Shaun Pather, declare that the contents of this thesis represent my own unaided work, and that the thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

______________________________  _______________________
Signed                        Date
ABSTRACT

As a phenomenon of the 1990s, e-Commerce is relatively new. Its advent offered the promise of new opportunities to businesses and entrepreneurs around the world. The hyperbole associated with the Internet and the Web resulted in a mindset that e-Commerce was an easy road to success. It was believed that this new technology-based approach would revolutionise business in a number of ways, including changing the relationships between the stakeholders and allowing small organisations to play on the global stage. However, the road to business enhancement through e-Commerce has not been easy. Many organisations have not survived their attempts to engage in e-Commerce and others have radically changed their approach since the e-Bubble burst. There were many reasons for the failure of these e-Commerce initiatives. They included poor business ideas, no control of expenditure, lack of general business experience and immaturity, as well as little understanding of the crucial importance of managing the technology through which the Internet and the Web delivers e-Commerce opportunities.

This thesis explores the intricacies of IS within the South African B2C e-Commerce environment and argues that without a coherent understanding of the factors affecting IS success, the implementation of traditional IS evaluation mechanisms may be problematic. A comparative analysis of studies in this field between the pre- and post-e-Commerce eras, ascertained a paucity of theoretical frameworks and a fragmented body of knowledge in the extant literature, with a narrow focus on web-interface issues. Consequently, the main aim of the study was to advance theory in the field of IS evaluation.

The empirical work reported in this thesis examines the role of information systems in facilitating the various components of e-Commerce. In the research a new name for this has been used, viz., e-Commerce Information Systems (ECIS). The research involved analysing evidence that was collected from over 60 interviews as well as from many websites and other documentation supplied by knowledgeable informants from South African B2C e-Commerce businesses. The transcription and coding of the substantive body of qualitative evidence was informed by grounded theory method, hermeneutical analysis, and reflexive interpretation. NVivo was also employed to facilitate the management and interpretation of the evidence.
The research resulted in six findings which offer insights into the drivers of ECIS success and which collectively serve as a set of management guidelines for the e-Commerce environment. Importantly, these findings document the need for customer-centricity throughout the system lifecycle, and bring to the fore the critical importance of harmonisation of business and IS mindsets in understanding ECIS performance. Further reflection, modelling and the juxtaposition of these findings led to the formulation of the ECIS Success Theory, which states:

E-Commerce information systems success is underpinned by a mindset which sees Customer-Centricity as one of the primary drivers of e-Commerce. Customer-Centricity pervades the key e-Commerce processes. However, Customer-Centricity alone is unlikely to lead to an optimal e-Commerce solution. For sustained success, business and IS mindsets need to be harmonised. Additionally, as customers’ tastes and preferences change, so too should the ability of the business to be responsive to these changes. Responsiveness is realised through the design of agile processes and systems. Implicit in the understanding of these three critical success factors, viz., Customer-Centricity, harmonisation, and agility, is that e-Commerce processes are supported by high quality e-Commerce information systems that are reliable and easy to maintain. To ensure success, all four of these factors need to be integrated into a competent business model. E-Commerce information systems success will be sustainable by the continuous assessment of Customer-Centricity, harmonisation, agility, changing environmental factors, and the quality of e-Commerce information systems.

This theory and its associated model provides the basis for a coherent approach in the development of specific ECIS evaluation instruments. The theory was refined in the final phase of the research, during which it was presented to both e-Commerce practitioners and members of the IS academic community. Finally the limitations of the research are acknowledged, and several avenues for future research, which have been created by the development of the theory, are identified.
ACKNOWLEDGEMENTS

Generosity is not giving me that which I need more than you do, but it is giving me that which you need more than I do  
Kahlil Gibran

The successful accomplishment of this research has been possible because of the guidance and support from a number of individuals. I would like to express my heartfelt gratitude and sincere appreciation to each and every person who enriched this journey of intellectual pursuit. In particular, I would like to acknowledge:

- My family: my wife Sue, for her unstinting love and devotion, and for unreservedly taking on the role of a ‘single parent’ over the past five years; my sons Hushav and Nishen for their patience, understanding, and for forgoing many father-son activities.
- My parents Juggie and May Pather: thank you for your love, and for all you have done for me in my lifetime.
- My many friends, and extended family for their constant encouragement and for keeping my spirits high: my sisters Preba, Romy, Mayendree; my parents in law Bobby and Radha Padayachee; and my dear friends Ravi Pillay, Gona Govender, Sudesh Naidoo and Kanthan Pillay.
- Prof Geoff Erwin, former Dean of the Faculty of Business Informatics, and current Director of the e-Innovation Academy (eIA): thank you for encouraging and supporting my growth as an academic. The completion of this study would not have been possible without your efforts in creating and maintaining a research-conducive environment.
- Colleagues at the Cape Peninsula University of Technology: Corrie Strümpfer, Stuart Warden, Profs Pieter van Brakel, Wallace Taylor, Andy Bytheway, Felix Dakora, and all the administrative staff, especially Ms Carolina Viljoen. Thank you for keeping me focused on my research.
- Colleagues in broader academe: Prof. Johann Mouton (University of Stellenbosch), Prof. Elizabeth Henning (University of Johannesburg), Dr Frank Bannister (Trinity College, Dublin), Dr David Barnes (University of London), Dr Matthew Hilton (Open University, UK), Prof. Freimut Bodendorf (University of Erlangen). Thank you for sharing your wisdom with me, and for your critical comments on the research.
- Prof. Liz Van Aswegen and Dr Juggie Pather: thank you for your assistance with the final editing.
- Most importantly I am indebted to my supervisor, Prof. Dan Remenyi, without whose expertise, guidance and mentorship I would not have been able to cross this Rubicon.

Contd/…
I also wish to acknowledge the support from the following organisations:

- The National Research Foundation (NRF) of South Africa. The financial assistance of the NRF towards this research is acknowledged. Opinions expressed in this thesis and the conclusions arrived at, are those of the author, and are not necessarily to be attributed to the National Research Foundation.

- The South Africa-Netherlands Research Programme on Alternatives in Development (SANPAD), for the one-year scholarship to participate in the PhD Research Capacity Initiative (RCI) programme. My appreciation to all the professors in this programme, who ensured that I was vested with a solid foundation for doctoral research.

Lastly, I would like to acknowledge all the informants from the following businesses, who gave their valuable time for interviews.

- 20Twenty Bank
- Beltel communications
- British Airways Comair
- Camera Clinic
- Conference Co-ord. Ltd.
- Cybercellar
- Deloitte & Touche
- Digital Planet
- Dulux
- EThekwini Customer Services
- Durban Poles
- e-Pages
- Exclusive Books
- Fundamo
- Health Focus
- Jadica Shipping
- Kalahari.net
- Kulula.com
- Last-minute
- Makro
- Micromesh
- Musica
- Net Florist
- Nu Metro Cinemas
- Old Mutual
- Oodles of Doodles
- Pick ’n Pay Supermarkets
- Porter Motor Group
- Price Waterhouse Coopers
- Pro-Digital
- SA Camera.co.za
- Software Futures
- Spar Group
- Spier Leisure Resort
- Ster Kinekor cinemas
- Take2.co.za
- Trade.net
- Woolworths
- Z-Logic
DEDICATION

For my late grandmother, Iylandam Sivagami Narainsamy
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The following research outputs were produced during the course of the study:

**Journal Articles**


**Peer-reviewed conference proceedings**


**Invited Seminars**

CHAPTER ONE

E-COMMERCE IN SOUTH AFRICA: AN INTRODUCTION AND BACKGROUND TO THE RESEARCH

Knowledge is like a ship because once it is in the bottle of truth it looks as though it must always have been there and it looks as though it could never get out again

(Collins, 1985)

Overview

This chapter introduces the subject of e-Commerce and explains the background to its prominence in many organisations. In tracing the development of e-Commerce, it describes the hyperbole that led to the bursting of the so-called e-Bubble. The chapter continues to describe the central issue of Information Systems success in the e-Commerce world. It positions e-Commerce in South Africa and it explains the importance of this subject to research in this country. This leads firstly to a statement of the research problem, followed by the research questions, aims and objectives that this study addresses. The essence of the research question is that as ICT plays a pivotal role in e-Commerce, successful e-Commerce Information Systems (ECIS) need to be evaluated and managed in a special way. Following on this, the importance of this research to both academe and the business community is discussed. Finally, an overview of the subsequent chapters is presented.

1.1 Introduction

This research was prompted by the impacts of the information revolution\(^1\) on the business world. The advent of the Internet and the Web in the early 1990s has been one of the catalysts of this revolution. Of the various uses found for the Internet and the Web, one of the more important was its adoption by organisations to facilitate their business with both customers and suppliers. The use of the Web as a platform to conduct business gave birth to the practice of electronic commerce, or

---

\(^{1}\) One of the central pillars of the new economy is Information. The term information revolution is preferred instead of terms such as Information Economy or Information Society, in order to draw a parallel to the previously used terms, Agricultural Revolution and Industrial Revolution. The Information Revolution therefore can be ascribed to the substantive increase in the availability of information due to the use of networked computers, the Internet and the Web in particular.
more commonly, e-Commerce. According to Delone and McLean (2004: 31), e-Commerce can be defined as the use of the Internet to facilitate, execute, and process business transactions. Thus at the core of all e-Commerce activities is the application of Information and Communications Technology (ICT). But unlike many traditional organisations, where ICT services may only be supportive and not mission critical, those organisations which are pursuing e-Commerce are much more reliant on this technology. If the computers or the telecommunications falter the e-Commerce organisation may come to a halt. It is therefore clear that ICT in an e-Commerce environment is central and that it needs to be understood, managed and its operation evaluated or assessed in a different way. In this research I have referred to ICT used to deliver e-Commerce as e-Commerce Information Systems (ECIS).  

1.2 The rush to e-Business

In the 1990s, the commercialisation of the Internet transformed the use of Information and Communication Technologies (ICTs) in the business world. Over this period of time it has been estimated that hundreds of billions of dollars have been spent on e-Commerce or e-Business (Sarner, 2004).

It was also estimated that in the mid 1990s there were some 30 million Internet users (Killen & Associates, 1996). But by the end of the 1990s this number was said to be more than 400 million. At one point both the

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2 With the advent of the web many businesses positioned and deployed IS to compete in the electronic market place. Examples of IS deployed in e-Commerce businesses include database management systems, order processing systems, and web-content management systems, to name just four. In this thesis, ECIS is used to refer to the collective IS deployed by e-Commerce businesses. (Refer to section 2.4.)

3 Information Technology (IT) has been used as an encompassing term in the past to refer to computing technologies and all related artefacts. However, in the current era, the role of networking, and hence communicating, is virtually inseparable from any other aspect of Information Technology. Thus the term ICT is increasingly being used instead of IT or IS.
CNN and the BBC claimed that there were some 20 million web-based businesses in existence which were commonly referred to as Dot.Coms. At the height of this enthusiasm for e-Commerce, organisations were being told by the media that Internet and Web-based business would effectively change the world. Some examples of the hyperbole surrounding Internet or Web-facilitated business\(^4\) included statements such as: ‘Dot Com or Be Gone!’, ‘be Digital or be Toast!’, ‘Get Web or be Dead!’ (Sterne, 2002).

By the year 2000 the business world had witnessed the “catastrophic collapse” of many “dot-coms”\(^5\) (Ames, 2001). However, it is commonly believed (Lee, 2001; Barnes & Hinton, 2004) that despite these failures, e-Commerce is a significant business issue with important successes, e.g. e-Bay, Amazon, Dell, Tesco, Ryan Air, Egg, and Google, to mention only a few international businesses. In South Africa companies such as Kalahari.net, netflorist.co.za, kulula.com, and cybercellar.co.za are further examples of business that have laid claim to successful e-Commerce (World Wide Worx, 2004). Notwithstanding these diametrically opposing circumstances regarding e-Commerce success, there are various sources (Chan \textit{et al.}, 2001; Stansfield & Grant, 2003; Sarner, 2004) which suggest that there is little doubt that, if implemented correctly, an e-Commerce strategy can contribute substantially to business profits. In the current era, it is now accepted that e-Commerce is generally no longer a subject of extensive hyperbole (Fairhurst, 2002). This is borne out by a recent survey conducted by Forrester Research (Bartels \textit{et al.}, 2006) in which decision-makers in enterprises from around the world were asked to prioritise their major technology themes

\(^4\) Web-facilitated business refers to businesses that use the Web to conduct business. This ranges from having just a static web-presence, advertising company details, products etc, to offering a full range of services including the sale of goods and services, account queries, distribution of products and service, etc. Angehrn (1997) describes web-facilitated business under four headings i.e. Information, Communications, Distribution, and Transactions.

\(^5\) The term dot-com is commonly used (e.g. Barua \textit{et al.}, 2001) to refer to an organisation that operates its business primarily on the Internet.
for 2006. These executives ranked “the initiation of Internet and e-Commerce activities” as one of their top six priorities (Bartels et al., 2006). Today organisations understand the potential of e-Commerce. Many organisations are now in a position to focus on how they can effectively use the Internet and the Web, together with sound management practices to achieve business success. Consequently, questions concerning how to ensure the successful use of ICT have come to the fore in the e-Commerce business world.

1.3 IS Success

From the time of the first commercial application of computers, businesses have depended on IS to varying degrees. Stylianou and Kumar (2000:99) sum up the strategic importance of IS in business quite aptly in arguing that:

“The importance of information technologies and the information systems function is no longer of debate among business people. The question, rather, is how an organization can take best advantage of IT in order to support its operations, add value to its products and services, and gain a competitive edge in the marketplace”.

DeLone and McLean (2003:10) have also contributed to this discussion by stating that:

“the measurement of IS success or effectiveness is critical to our understanding of the value and efficacy of IS management actions and IS investments”.

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6 IS Success is defined as the extent to which IS meet the expectations of organisations in respect of their facilitating the realisation of business objectives. The definition of success is dealt with in more detail in Chapter 2.

7 The terms IS Success and IS Effectiveness are used interchangeably in the literature (e.g. Seddon et al., 1999). In this thesis the term IS Success will be used mainly, except in circumstances where the literature being cited uses the term IS Effectiveness.
Thus IS Success measurement has been one of the key issues of concern both in IS management practice and research (Seddon et al., 1999). Research into IS Success has posed a hurdle to the IS community in that it offers both conceptual challenges as well as implementation difficulties. These issues have been researched by many academics (Ein-Dor et al., 1981; Fuerst & Cheney, 1982; Ives et al., 1983; Ives & Olson, 1984; Delone & McLean, 1992; Remenyi et al., 2000; Whyte & Bytheway, 1996; Watson et al., 1998; Seddon et al., 1999; Saunders & Williams, 2002; Delone & McLean, 2004), each of which has taken a differing stance as to what constitutes success.

1.3.1 Models of IS Success

Research over the past three decades has resulted in a number of approaches to the evaluation of IS Success. These include: system usage (Srinivasan, 1985; Trice & Treacy, 1986); information value (Gallagher, 1974); user satisfaction (Hamilton & Chervany, 1981; Ives et al., 1983; Bailey & Pearson, 1983; Shaw et al., 2002) and more recently service quality (Pitt et al., 1995; Kettinger & Lee, 1995; Van Dyke et al., 1997; Jiang et al., 2002) to mention just four approaches. Such varied approaches to IS Success measurement suggest a lack of agreement regarding the question of what constitutes IS Success.

This diversity of approaches was from an early stage a cause of concern for both researchers and practitioners. One of the oft-cited papers in the literature is that of DeLone and McLean (1992). In their paper, these authors synthesized 100 empirical IS Success measures (published between 1981 and 1987) into a unified model. The resultant IS Success Model (DeLone & McLean, 1992) has been regarded by many researchers as a major contribution to this area of research (Molla & Licker, 2001; Garrity et al., 2005) and has been the focus of several studies since 1992. In 2003 this model was updated (DeLone & McLean, 2003) to reflect changes observed in the literature over the
Chapter 1: Introduction & Background to the Research

decade from 1992 to 2002. These authors argue that their updated model of IS Success is also applicable to the e-Commerce environment (DeLone & McLean, 2004). However, they acknowledge that the two examples they use to demonstrate application of the updated IS success model to e-Commerce business are “compelling logically” (DeLone & McLean, 2004:41), but require empirical testing.

1.3.2 Inadequacy of IS measures

Despite this large amount of research activity into IS Success, there have been several authors who are of the view that this area of research has not been adequately investigated (Miller & Doyle, 1987; Watson et al., 1998; and Molla & Licker, 2001; Zhu & Kraemer, 2002; Love et al., 2004). There is considerable difficulty in being able to measure IS Success and it has been suggested that the search for appropriate metrics has resembled the proverbial search for the Holy Grail (Arnold, 1995). Other sources, such as Seddon et al. (1999), describe the question of IS Success as one of this field’s “haunting problems”. They further argue that although there is a thriving research community that offers answers to questions regarding new ways to manage IS, and new ways of designing and building IS, there are few effective guidelines about how the success of IS should be assessed.

1.3.3 Success of ECIS

Notwithstanding the reported difficulties in developing measures of IS Success, business managers who follow sound management practices, will still require indicators of the success of their IS investment. This is also true in the e-Commerce environment, especially if one considers the large sums being invested in Internet-based business. Thus questions concerning IS Success are equally important to managers of e-Commerce businesses. There are several reasons why researchers should be concerned with ECIS Success.
As each year passes more and more money is being spent by consumers on online purchases. Gartner research reports that business-to-consumer (B2C) online purchases in the US continues to grow at an extraordinary rate, year after year with an increase of approximately $5 billion to $65 billion in 2004 (Sarner, 2004). In South Africa, there has also been a positive growth in B2C expenditure. (Refer to Table 1.1.). Thus with an ever increasing growth of online sales, managers of e-Commerce businesses will be keen to maximise the potential from ECIS. Consequently, questions pertaining to IS Success that have arisen over the past 30 years are perhaps of even greater importance within e-Commerce businesses.

The literature indicates that e-Commerce businesses have different priorities in terms of improving performance measurement as compared with those of traditional or brick and mortar organisations (Adams et al., 2001: 4). The issues relevant to IS Success in e-Commerce are different from brick and mortar businesses for at least three reasons. These are:

- There is an increased reliance by e-Commerce business on ECIS to keep the business operative.
- ECIS are considered to be considerably different from brick and mortar IS in terms of their scope and focus (Zwass, 1996; Garrity et al., 2005).
- The context of the IS end-user in the e-Commerce environment has dramatically changed. Online consumers are simultaneously IS users (Koufaris, 2002). Thus the success of ECIS is now also dependent on the satisfaction of users who are located beyond the traditional business boundary.

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8 The term “brick and mortar” is used describe businesses with a physical presence in the market place. Traditionally customers travel to the premises of a brick and mortar business in order to purchase goods. In the case of e-Commerce business, customers “visit” the store via the medium of the Web.
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There are several sources of support for conducting research into ECIS Success. For example, Garrity et al. (2005:486) argue that without a clear understanding of the dynamics of ECIS Success to guide businesses, proper strategies and systems designs are mere speculation. They suggest that a “central activity for researchers will be to define and operationalise the constructs for understanding the success of electronic commerce systems”. Other authors such as Lee and Kouzar (2005) aver that decision-makers at e-Commerce organisations continue to make vast investments in developing websites for e-Business without having clear knowledge of what factors contribute to developing a high quality website and how to measure effects on e-Business success. Lastly, Sterne (2002) has identified a lack of success measures as among the top five barriers to the development of e-Business.

1.4 A situational analysis of the e-Commerce environment in South Africa

1.4.1 South African ICT infrastructure

South Africa is a country spanning 1,219,090 square kilometres, with a population of approximately 48 million people, of whom 9.9% (4,780,000) are Internet users (Internet World Stats, 2005). Known as the gateway to Africa, South Africa is home to 6% of Africa’s population, and produces 18% of the continent’s GDP (DTI, 2004).

The mainstream ICT supply sector is described as being “broadly healthy and profitable” (World Wide Worx, 2003), with a “world-class internet and e-commerce sector” (South African Business Guidebook, 2004:204). South Africa ranks twenty-third in telecommunications

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9 From a size perspective South Africa is approximately five times larger than the UK. The population density of South Africa is 36.35 per km² compared with 246.88 per km² in the UK.
development in the world and has a large network infrastructure, necessitated by the country’s large geographical area. Covering about 156 million circuit-kilometres, the transmission network constitutes the backbone of all telecommunications services. The telecommunications network is almost wholly digital. Digital microwave and optical fibre serve as the main transmission media for the inter-primary network, interconnecting all major centres. The country has approximately 4.9 million installed telephones and 4.3 million installed exchange lines representing 39% of the total lines installed in Africa (International Marketing Council, 2003).

South Africa is also the twentieth largest consumer of IT products and services in the world, ranking eighteenth in terms of Internet usage. The promulgation of the Telecommunications Act of 1996 has resulted in the accelerated rollout of IT infrastructure. In 2001, the ICT Development Council was introduced, focusing on IT training and certification, wireless development, pilot laboratories, niche software development and niche application enhancement, call centres and the establishment of infrastructure and application hosting for Africa. Most international corporates, recognised as leaders in the IT sector, operate subsidiaries from South Africa, including IBM, Unisys, Microsoft, Intel, Systems Application Protocol (SAP), Dell, Novell and Compaq (DTI, 2004).

The Map of the IT and Telecoms Sector (MITTS) survey of the ICT sector over 2002-2003, indicates that “South Africa’s top ICT companies have seen a hefty growth in turnover for the past two years” (World Wide Worx, 2003). This report also reveals that the annual sales of these companies in 2002 were R107 billion which reflects an increase of 21% over 2001. A more recent market analysis of listed ICT shares shows that “share prices of ICT companies in South Africa increased by 30% in 2004, compared to the American Nasdaq index which fell by more than 10% in the same period” (World Wide Worx, 2005). With such high expenditures in ICT, business executives expect to see a return on their
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10 Such expectation will be especially relevant for executives in the e-Commerce sector which is highly dependent on ICTs.

More recently the entry of broadband technologies has been seen as an important factor in further catalysing Internet use in South Africa. According to Goldstuck et al. (2006:12)

“In both the wireless and fixed line environments, the market is moving towards an explosion of growth, with healthy competition and a range of different technologies which should be able to provide true broadband in the future”.

This brief overview indicates that there is a modern and growing ICT infrastructure in South Africa. From a technology perspective, this augers positively in terms of the continued growth and sustainability of e-Commerce business in this country.

1.4.2. E-Commerce activity in South Africa

Even though South African e-Commerce business could have learnt more from the mistakes of their overseas counterparts (Buhrmann, 2002: 49), the local market in South Africa was not immune to the e-Commerce hyperbole that caused the dot.com crash. In 2002 it was reported that 35% of the online stores that were in business at the end of 2000 no longer existed at the end of 2001 (Goldstuck, 2002:13). In 2005 the situation was not that different. Goldstuck et al. (2006: 4) reported that more than 25% of online retailers that were in business at the end of 2004, had closed down their sites during 2005.

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10 According to Harrison (2004) 57% of CEOs acknowledge that optimal use of Information Systems is a key to gaining competitive advantage, and 91% of CEOs expect IS to have a significant bottom line impact.

11 The online retailers ShoppingMatrix.com, StopQ.com and banking venture bluebean.co.za are just three examples of well-known South African e-Commerce ventures that shut down within a year of opening for business.
A survey of online retail activity (Goldstuck, 2002) provides insight into the 2000-2002 state of e-Commerce activity in South Africa. This survey reports that online retail trade in South Africa doubled between 2000 and 2001 to R162 million. The report describes online retail in South Africa as being “at a very early stage of its market penetration, and remaining deeply immature in its implementation” (Goldstuck, 2002:10). This finding is corroborated by a study conducted by the Department of Trade, Industry and Statistics South Africa, which established that “the use of the Internet for commerce, especially by small and medium-sized businesses, is still in its infancy in South Africa” (Sunday Times: 2004).

While there was an initial favourable growth in online sales during the 2000 to 2002 period, a research report released in June 2004 indicates a “slow down in growth of online retail” representing a “mere 0.14% of the overall retail market in South Africa” (World Wide Worx, 2004). Table 1.1 shows that the growth of online retail has been slowing down in the period 2000 to 2005. This could be attributed to a variety of issues. For example, one South African study into online banking found that that a majority of customers were dissatisfied with aspects of user friendliness of the websites (Singh, 2004).

\[\text{Table 1.1/…}\]

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12 The Goldstuck report is an annual survey conducted by a private research enterprise World Wide Worx. It is the only source of in-depth analysis of the online retail environment in South Africa, and is often quoted in the media and in government reports.

13 Gartner Research reports that online sales in the US represents 1.7% of the total retail sales (Sarner, 2004). This makes an interesting comparison with South Africa, where online sales comprise just 0.14% of total retail.

14 Besides Singh (2004) there were no other empirical studies that could be found that investigated the reasons for slow growth in the South Africa.
### Table 1.1: Online retail growth in South Africa

<table>
<thead>
<tr>
<th>Year</th>
<th>US $ 000 000s</th>
<th>% Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>$0.11</td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>$0.22</td>
<td>106%</td>
</tr>
<tr>
<td>1998</td>
<td>$0.50</td>
<td>127%</td>
</tr>
<tr>
<td>1999</td>
<td>$2.36</td>
<td>367%</td>
</tr>
<tr>
<td>2000</td>
<td>$11.71</td>
<td>396%</td>
</tr>
<tr>
<td>2001</td>
<td>$23.14</td>
<td>97%</td>
</tr>
<tr>
<td>2002</td>
<td>$36.00</td>
<td>55%</td>
</tr>
<tr>
<td>2003</td>
<td>$48.71</td>
<td>35%</td>
</tr>
<tr>
<td>2004&lt;sup&gt;15&lt;/sup&gt;</td>
<td>$61.14</td>
<td>25%</td>
</tr>
<tr>
<td>2005</td>
<td>$73.43</td>
<td>20%</td>
</tr>
</tbody>
</table>

### 1.4.3 Role of the South African government

South Africa is a young democracy that emerged from the apartheid era just twelve years ago. The development of the country’s economy is seen as being integral to the success of this transformation. The opportunities presented by the use of ICTs in business are viewed by the government as one of the means by which economic growth can be sustained (South Africa, 2002).

The South African government has been proactively promoting the use of ICTs in the business arena. In his state of the nation address in 2002, President Thabo Mbeki, acknowledged that:

> “...a critical and pervasive element in economic development in the current age is the optimum utilisation of information and communications technology”.

The government is particularly concerned with facilitating the economic empowerment of previously disenfranchised groups. To this end a

<sup>15</sup>The extent of e-Commerce activity in South Africa ($61.14 million in 2004) is better understood when compared to that of the US which is reported as being $65 billion (Sarner, 2004) in the same period.
policy of promoting economic growth through the development of Small and Medium Enterprises (SMEs) has been adopted. As part of its strategy to promote such growth, the government has implemented a plan to promote the adoption of ICTs, especially Internet technology amongst business (South Africa, 2002:9).

Examples of the government’s serious intent to promote business use of the Internet, have been the promulgation of the Electronic Communications and Transactions (ECT) Act (Act 25 of 2002) and the launch of the Online Publisher’s Association (OPA). The ECT Act is especially significant as it encapsulates a common policy to govern electronic trading in this country. In the preamble of this piece of legislature, specific mention is made of the need to “promote skills development in the areas of information technology products and services in support of electronic transactions” as well as to promote “business strategies for SMMEs and other businesses to utilise electronic transactions” (South Africa, 2002:8-9).

1.4.4 Increasing levels of online activity and e-Commerce

Both locally and internationally, there has been a steady growth in the number of Internet users (Internet World Stats, 2005). Gartner research predicts that by 2007 approximately 1.35 billion people worldwide will be online (Sarner, 2004). In South Africa the number of Internet users has steadily increased since 2000. In 2005 there were an estimated 4.7 million Internet users in the country (Internet World Stats, 2005).

This increase in the Internet user base has had a positive impact on e-Commerce. In South Africa, online retail sales increased by 51%

\[16 \text{ In South Africa, the term Small, Medium and Micro Enterprises (SMMEs) is often used, as opposed to Small and Medium Enterprises (SMEs), which is used in literature emanating from countries in other parts of the world.}\]
Chapter 1: Introduction & Background to the Research

between 2003 and 2005 (World Wide Worx, 2005). These statistics are a clear signal that the Internet as a medium for business is responsible for channelling substantive amounts of turnover for businesses of various persuasions. Indeed, with such lucrative possibilities of turnover, it can be expected that businesses will continue investing in ICTs either as new dot.com businesses, or as expansions of traditional brick and mortar business.\footnote{Current trends indicate that e-Commerce adoption in South Africa has been on the increase. The number of retail websites in South Africa increased from 719 at the end of 2003 to 826 at the end of 2005 (Goldstuck et al., 2006).}

1.5 The research problem

The discussion in the foregoing sections has highlighted several issues that contributed to my understanding of the research problem.

- The world of business has moved beyond the first wave\footnote{There are some suggestions that we could be entering a second wave, referred to as Web 2. This thinking has been prompted in part by the e-Bay purchase of SKYPE (Schofield, 2005) for several billion dollars. SKYPE is a relatively new business which has yet to make a profit. Additionally the term Web 2 is being used to describe more personal applications than were offered before.} of e-Commerce hype. In the current era, a more mature business approach has developed. E-Commerce managers now understand that an online presence in itself will not produce sustained growth and profitability. Rather managers are required to re-evaluate their current business strategies especially in relation to how ECIS contribute to e-Commerce success.
- The evaluation of IS Success is a challenge for both the practitioner and IS research communities. A number of studies have been conducted, with a variety of outcomes. However the questions concerning ECIS Success, specifically, have not been thoroughly investigated. There is currently a lack of a coherent understanding of the connection between ECIS Success and e-
Commerce. Importantly, there is an absence of empirically grounded theories that offer insight into ECIS Success.

- Although at present there is a relatively low adoption of e-Commerce by consumers, current trends indicate that this is steadily increasing.

In light of the above, the following research problem has been identified:

The literature highlights the relevance of two central issues to the research problem. Firstly e-Commerce is considered to be an important business issue in the new South African economy. Secondly ECIS are central to the success of e-Commerce. However some authors argue that this technology is not yet applied in an optimal way. This calls for a better understanding of how ECIS can be effectively managed. In order to optimise ECIS managers of e-Commerce businesses are required to evaluate the success of these systems. They therefore require a comprehensive understanding of the factors that affect ECIS Success.

1.6 Research questions

The formulation of the research questions was motivated by a literature review as well as by discussions with a number of academics and e-Commerce practitioners. As a result of these discussions, I ascertained that there was a lack of a well-founded, coherent understanding of the concepts associated with ECIS Success. Without a conceptual basis for understanding ECIS Success, the implementation of any evaluation mechanism would prove to be problematic. Therefore a logical first step would be to investigate ECIS Success factors, and to develop a theory to explain the phenomena associated with success. Thus, the main research questions that this study addresses are as follows:
In B2C e-Commerce businesses:

a. How do ECIS contribute to successful business?
b. What are the drivers of ECIS Success and how do they relate to one another?
c. What are the important management issues that affect the success of ECIS?

1.7 Research aims & objectives

In pursuance of the research questions above, the specific aims of this study are:

- to review existing literature with regard to IS Success and its evaluation;
- to investigate the research questions through the collection of empirical evidence\textsuperscript{19} from knowledgeable informants within the South African e-Commerce environment;
- to develop a theory regarding ECIS Success; and
- to confirm or validate this conjecture with knowledgeable stakeholders in the field.

1.8 Research Design & Methodology

The research design, in using a critical-realist intellectual underpinning, is oriented to the qualitative paradigm so as to facilitate the objective of theory development. Empirical evidence was gathered from e-Commerce practitioners until a point of theoretical saturation was reached. A total of 65 semi-structured interviews were conducted with knowledgeable informants from 36 businesses between March 2003 and

\textsuperscript{19} The term data usually implies numbers, and is more often associated with quantitative studies. In this study, in keeping with the notion of qualitative data in the form of text, I prefer to use the term evidence as opposed to data.
November 2005. In addition to interview-transcripts the evidence also comprised business documentation, information gleaned from business’ websites and field-notes. This evidence was analysed through the combined application of an adapted grounded theory method, hermeneutics and reflexive interpretation. The analysis and interpretation of the evidence was an iterative process that inductively led to the derivation of six major findings. These findings, which are presented as a higher order narrative, provide an in-depth insight into the pertinent IS management issues that impact on ECIS success. Finally, the juxtaposition of these themes form the foundation of the theoretical contribution of this thesis, viz., an ECIS Success Theory.

1.9 Importance of the research

The recorded high rate of failure of e-Commerce ventures in South Africa (Goldstuck, 2002) and the relatively slow growth of online retail sales (World Wide Worx, 2004), bear testimony that local e-Commerce businesses can benefit from the outputs of this research. South Africa has the technological infrastructure, and an existing core of businesses that have harnessed the commercial capability of the Internet. However, the adoption and use of e-Commerce in South Africa is considered to still be in its infancy, when compared with the rest of the world. Current trends suggest that the rate of adoption of e-Commerce is on the increase. Thus the research outputs from this study will be of importance as e-Commerce adoption evolves in South Africa. Of course the increasing rate of adoption in itself is not an indication of successful e-Commerce. As several authors argue (Lee, 2001; Satish & Raman, 2002; Benbasat et al., 2000), the more effectively we are able to implement IS, chances of failure are reduced, and the benefits to the organisation and its customers are greatly enhanced. Therefore the findings of research into ECIS Success will contribute towards successful e-Commerce adoption.
This research is of importance to the academic community as well. In the current literature it is clear that questions concerning IS Success in general, are the subject of substantive debate, with a large number of studies published on this topic. However little has been done to extend the IS Success debate to the context of e-Commerce business. In the literature there is a fragmented approach to ECIS Success. An ECIS Success Theory will therefore be an original contribution to the body of knowledge.

1.10 Overview of the thesis

A brief overview of the remainder of the thesis is as follows:

CHAPTER TWO: IS SUCCESS: PRINCIPAL CONCEPTS, THEORIES AND MODELS

This chapter explores a range of ideas concerning e-Commerce Information Systems, the factors affecting its success and the evaluation thereof. The chapter commences with a discussion of the background to e-Commerce and an overview of the various business models that are in use today. The concept of e-Commerce Information Systems (ECIS) is thereafter introduced. Following on this, the history of how IS has impacted on business over the years is explored. The next section contextualises the field of IS Success within this study. This sets the stage to review how IS success has been approached in the literature that deals with e-Commerce business, as well as literature from the pre-e-Commerce era. Thereafter a sample of studies is used to conduct a comparative analysis of e-Commerce and pre-e-Commerce studies. Lastly, the salient aspects of the discussion are reviewed and these are weighed against the principal research questions of the study. From the work undertaken in Chapter Two it is clear that the research questions remain a challenge and are of importance to the academic community.
CHAPTER THREE: PHILOSOPHICAL FOUNDATION AND RESEARCH DESIGN

This chapter is concerned with the epistemological influences on this research, and key methodological issues relevant to this study. The chapter describes the research design, and provides the raison d’être behind the choice of approaches that have been pursued in this research. An argument is presented as to why a critical-realist framework is an appropriate underpinning for this study. Thereafter the two main paradigms of quantitative and qualitative research are contrasted, and the use of the semi-structured interview technique as the primary method to collect evidence is motivated. After presenting a framework for developing the theory, the chapter concludes by discussing how qualitative research should be evaluated.

CHAPTER FOUR: STRATEGIES FOR THE COLLECTION AND ANALYSIS OF EVIDENCE

Using the research design presented in Chapter Three as a basis, this chapter firstly provides details on how the qualitative research method was employed in this study and especially how it was applied in the process of gathering the evidence for the development of the theory. The next section of the chapter discusses techniques for analysis, and concludes that the best approach to take is to adapt the grounded theory method and apply both hermeneutical and reflexive interpretation. Following on this, details of the method of analysis are presented. I describe how analysis proceeded from inductive identification of concepts, to a higher order narrative. Lastly, I discuss how a computer-aided qualitative data analysis software (CAQDAS) package was used to facilitate the manipulation and interpretation of the evidence.

CHAPTER FIVE: RESEARCH FINDINGS: TOWARDS AN ECIS SUCCESS THEORY
In this chapter the outcomes of the analysis are presented as a higher order narrative. The higher order narrative is the penultimate step towards the derivation of a theoretical conjecture and is presented as six inter-related findings. The in-depth discussion of these six findings articulates a detailed response to the principal research questions of this study. It is based on the collective body of evidence and provides both a rich and detailed insider-view of how ECIS is deployed and managed within e-Commerce businesses in South Africa.

CHAPTER SIX: ECIS SUCCESS: A THEORETICAL CONTRIBUTION & CONCLUSIONS

This Chapter brings the research to a conclusion, by presenting an ECIS Success Theory, which is a contribution to the theoretical body of knowledge. The Chapter firstly discusses how the theory was derived from the findings, after which the importance of the new theory and its relevance to e-Commerce businesses and academe are examined. Following this, the research outputs are evaluated in terms of three fundamental qualitative research criteria, viz., credibility, transferability and dependability. The latter includes a presentation of an intellectual and a physical research audit trail. Several limitations of the study are thereafter reflected upon, before avenues for future research are discussed. The chapter ends with a conclusion that the research has been valuable both to the researcher, and also to the community of stakeholders in which the research was conducted.
CHAPTER TWO

IS SUCCESS: PRINCIPAL CONCEPTS, THEORIES AND MODELS

“The key question is not whether to deploy Internet technology, but how to deploy it”

(Porter, 2001:64)

Overview

This chapter explores a range of research perspectives concerning IS, the factors affecting its success and the evaluation thereof. These perspectives are based on authors who are recognised as authorities and thought leaders in the academic community. They make it clear that this field of study is appropriate for academic research at the doctoral level and that there are appropriate research questions to answer.

The chapter commences with a discussion on the background to e-Commerce and an overview of the various business models that are in use. The concept of e-Commerce Information Systems (ECIS) is then introduced. Following on this, the history of how IS\(^1\) has impacted on business over the years is explored, i.e., from the Automate to the current Transfigurate phase. The next section contextualises the field of IS Success by firstly examining various definitions of success, then organising the IS Success literature into a framework based on the systems development life cycle, and lastly by demarcating the scope of this study within this framework. This sets the stage to review the approaches to the study of IS Success both within e-Commerce business, as well during the pre- e-Commerce era. The review incorporates a discussion of IS Success models, along with an overview of the user-satisfaction, service-quality, and systems-quality dimensions of IS Success. Thereafter, a sample of studies is used to conduct a comparative analysis of e-Commerce and pre-Commerce studies.

Lastly, the salient aspects of the discussion are reviewed in relation to the principal research questions of the study. From the work undertaken in this chapter it is clear that the research questions raised in Chapter One remain a challenge and are of importance to the academic community.

\(^1\) Note that the acronym IS is used in this thesis as both singular and plural, i.e., Information System or Information Systems.
2.1 Introduction

By the end of the 1980s it was estimated that in the preceding decade the US economy had invested one trillion dollars on ICT (Willcocks & Graeser, 2001). In simple terms, i.e., not discounted money, this was an average of 100 billion dollars a year. However, by the mid-1990s this sum had increased to about 250 billion dollars per year. In the US alone, during the past six decades, business investment in IT has become an increasingly larger component of the US GDP, with the ratio of business investment in IT to the GDP rising from 1% in the 1950s to more than 4% in the current era. Forrester Research forecasts that IT spending in the US will increase from 800 billion dollars in 2005, to almost 1000 billion dollars in 2008 (Bartels, 2004). This represents a 25% increase in expenditure over just three years. In South Africa, ICT expenditure, although much lower than that of the US, also reflects similar growth trends (World Wide Worx, 2003).

Two central issues influenced the extraordinary growth in expenditure during the 1990s. The first of these was the fear that old legacy systems might cause damage to the operations of organisations as the year 2000 approached. The second reason was the unprecedented opportunities presented by the Internet and the Web. As a result, in the past decade, there has been a boom in e-Commerce and the associated investments in IS (Dehning et al., 2004). The subject of this dissertation, which is motivated by the second of these issues, concerns how IS are successfully deployed in the B2C e-Commerce retailing context.

ICTs have been deeply ingrained in almost all spheres of our lives, so much so that today ICT has become the primary driver of a new vision for our way of life, referred to as the information society (Turner, 2000). In the business sector, there is an increasing awareness that the implementation of IS is indispensable to the provision of organisational services. As a result, the implementation and management of IS present
both major opportunities and challenges to businesses (Joshi & Pant, 2002). However, the need for flexibility, competitiveness, and improved performance has meant that many businesses continue to adopt IS without rigorous evaluation. It has been argued that businesses have become so reliant on their IS for strategic, tactical and operational benefits, that they overlook the importance of evaluating the success of such investments, and instead favour a more intuitive evaluation approach that is often nothing more than an act of faith. (Byrd & Marshall, 1997; Ezingeard et al., 1998; Irani et al., 1999; Irani et al., 2000).

The increased complexity of IS, combined with the uncertainty and unpredictability associated with its benefits and costs, clearly points to the need for evaluation procedures that offer companies a deeper insight into the impact of IS investment (Irani et al., 2000). The question of IS Success and its evaluation is one that has generated considerable interest among researchers over the past twenty years. Evidence of this interest abounds in the literature, with special issues of journals focusing on this topic. There are also several books such as Wiggers et al. (2004), Remenyi et al. (2000), Willcocks and Lester (1999), to name but a few, as well as at least one annual conference devoted to this issue. Such a huge effort by the IS research community is indicative of the importance attributed to the success of IS. Since the advent of Internet-facilitated business in the 1990s, the concerns around IS Success have added new questions to the agenda of IS researchers.

2.2 E-Commerce: a brief background and definitions

The Internet, which is essentially a large network of interconnected computer networks (Schneider, 2002), has had a profound impact on the world of business. From its military, research and academic background, the Internet has evolved into an important business tool (Lawrence et al.
The development of the HyperText Transfer Protocol (HTTP) in 1991, which gave birth to the Web, set the stage for the commercial adoption of the Internet by businesses.²

E-Commerce is often thought to refer to the buying and selling of goods through the Internet only. However, e-Commerce involves much more than electronically mediated financial transactions between organisations and customers (Chaffey, 2002). Table 2.1 presents a range of perspectives regarding what is considered as e-Commerce.

<table>
<thead>
<tr>
<th>PERSPECTIVE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communications</td>
<td>To deliver information, products, services and payments over the telephone, communication networks and other means.</td>
</tr>
<tr>
<td>Business</td>
<td>To automate business transactions and work flows</td>
</tr>
<tr>
<td>Service</td>
<td>To cut service costs while improving the quality of goods and increasing the speed of service delivery.</td>
</tr>
<tr>
<td>Online</td>
<td>To provide the capability of buying and selling products and information over the Internet.</td>
</tr>
</tbody>
</table>

Given these varying perspectives, there are a number of definitions of e-Commerce, e.g.

“the sharing of business information, maintaining business relationships and conducting business transactions by means of telecommunications networks” (Zwass, 1996);

“online commercial activity” (Strader & Shaw, 1999);

“the use of electronic networks to facilitate commercial transactions” (Turner, 2000);

“the conduct of business among e-business and consumers” (Cox & Dale, 2001); and

“the use of the Internet to facilitate, execute, and process business transactions” (Delone & McLean, 2004).

² Refer to Oz (2002: 3) for a detailed timeline of the Internet from 1962 to 1999.
In the context of this study, e-Commerce refers to web-facilitated sales of products, services, and information by businesses to consumers, i.e., B2C e-Commerce.

2.3 E-Commerce business models

A business model is a set of planned activities designed to create profit in a marketplace. According to Weill et al. (2005:5), “a business model consists of two elements, viz., what the business does, and how the business makes money doing these things”. Magretta (2002:86-87) suggests that a good business model remains essential to every successful organisation, whether it’s a new venture or an established player. This is supported by Quaddus and Achjari (2005), who maintain that one of the reasons for e-Commerce failure is that companies do not have well-planned business models.

e-Commerce businesses have adopted a number of different business models which employ the unique qualities of the Internet and the Web (Timmers, 1998). Wang (2001:304) defines an e-Commerce business model as

“a competition strategy for the marketplace and a structure of business processes for the entire electronic trade including marketing, advertising, negotiation, purchasing, logistics of products, payment with means of security, post-sales service, and post-sales intelligence”.

Angehrn (1997) developed the ICDT Model (Figure 2.1), which facilitated our understanding of the different Internet strategies used by companies. Today, almost ten years later, the ICDT model is still relevant, as e-Commerce businesses are found to be operating in one or more (or a combination) of the virtual spaces indicated in the model.
The ICDT Model describes the segmentation of the space of new business opportunities created by the Internet, viz., the virtual information, communication, distribution and transaction spaces. These four virtual spaces are described by Angehrn, 1997:362-363) as follows:

- **Virtual Information Space (VIS):** The VIS consists of Internet-based channels through which economic agents display information about themselves, and the products and services they offer. From a consumer perspective, the VIS provides an efficient approach of gathering information and comparing market offers.

- **Virtual Communication Space (VCS):** The VCS allows economic agents to meet to exchange ideas and experiences, engage in relationships and create different types of communities. This has created virtual communities of similar interest, e.g., Internet-based news and user groups, whose members bypass geographical constraints.

- **Virtual Distribution Space (VDS):** The VDS represents three strategic options for Web business. The first option relates to a distribution channel suitable for a variety of products and services.
Electronic books, articles, pictures, music and video tracks belong to this category. As a second option, businesses use the Web as a distribution channel for non-physical services such as text, voice or video-based consulting. Thirdly, the VDS can be used to enhance the traditional products and services offered by businesses by allowing customers to access customer-support services such as product-related information, training and product updates.

- **Virtual Transaction Space (VTS)**: The VTS consists of Internet-based channels through which businesses can exchange formal business transactions such as orders, invoices and payments.

Since the publication of the ICDT model in 1997, researchers have analysed e-Commerce business models from many different perspectives and frameworks (Hogue, 2000; Barua *et al*., 2001; Weill *et al*., 2005). Examples of these are Business to Consumer (B2C), e.g. Amazon.com, Business to Business (B2B), e.g., eSteel.com, Consumer to Consumer (C2C), e.g., eBay.com, Business to Government (B2G) and Mobile Commerce (Kalakota & Whinston, 1996; Laudon & Traver, 2004; Schneider, 2006). Of these, the B2C domain has been the most widely researched (Wareham *et al*., 2005), possibly because it has proliferated in a variety of e-Commerce business models. Table 2.2 summarises the common B2C models that are in use today.

*Table 2.2/…*

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3 The rapid pace at which the Internet has been adopted is apparent if one notes Anghern’s comment in 1997 about the Virtual Transaction Space: “…the Internet has not yet been extensively used as a transaction space, mainly because of its underdeveloped legal, security and reliability aspects” (Anghern, 1997:363). Anghern underestimated the rate at which the Internet would proliferate in the business world.
Table 2.2: B2C business models
(Sources: Timmers, 1998; Laudon & Traver, 2004)

<table>
<thead>
<tr>
<th>B2C Business Model</th>
<th>Examples</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portal</td>
<td>Yahoo.com, ananzi.co.za</td>
<td>Offers an integrated package of content services and content-search, news, email, chat, music downloads, etc.</td>
</tr>
<tr>
<td>E-Tailor</td>
<td>Amazon.com, cybercellar.co.za</td>
<td>Online version of a retail store, where customers can shop at any hour of the day or night.</td>
</tr>
<tr>
<td>Content Provider</td>
<td>CNN.com, Mg.co.za</td>
<td>Information and entertainment providers like newspapers, sports sites and other online sources that offer customers up-to-date news, and special interest groups how-to guidance, tips, information, and sales.</td>
</tr>
<tr>
<td>Transaction Broker</td>
<td>E-Trade.com, Travelocity.com</td>
<td>Processors of online sales transactions, such as stock brokers and travel agents, that increase customers’ productivity by helping them get things done faster and more cheaply.</td>
</tr>
<tr>
<td>Market Creator</td>
<td>Ebay.com, BidOrBuy.co.za</td>
<td>Web-based businesses that use Internet technology to create markets that bring buyers and sellers together.</td>
</tr>
<tr>
<td>Service Provider</td>
<td>Lawinfo.com, Mybconsulting.com</td>
<td>Companies that make money by selling users a service, rather than a tangible product.</td>
</tr>
<tr>
<td>Virtual Community Provider</td>
<td>Ivillage.com, About.com</td>
<td>Sites where individuals with particular interests, hobbies, and common experiences can come together and compare notes.</td>
</tr>
</tbody>
</table>

The various B2C models described above are representative of a new paradigm in the world of retailing. Oz (2002) describes this paradigm as the third wave of retailing. In using the grocery market as an example (refer to Figure 2.2), Oz (2002) describes how in the B2C E-Tailor model, customers do not have any intimate or personal relationships with the retailer.
Chapter 2: IS Success: Principal Concepts, Theories And Models

2.4 E-Commerce Information Systems (ECIS)

There are a number of different systems that are required to support e-Commerce. This includes Web-based Information Systems (WIS), which are systems developed using Web technology such as

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Oz (2002) advises online retailers to understand the limits of intimacy and immediacy in order to succeed with e-Commerce. He suggests that customers could be compensated for the lack of intimacy by using IS as a lever to offer customers benefits such as lower prices, excellent service, and quick delivery. IS is therefore one of the key resources on which the success of the e-Commerce business model depends.

Porter (2001:73) postulates that Internet business models “seem to refer to a loose conception of how a company does business and generates revenues” and that “the business model approach to management becomes an invitation for faulty thinking and self-delusion”. Porter’s assertion is supported by Magretta & Stone (2002), who posits that the term “business model” was used so often during the Internet boom to give legitimacy to bad business ideas, that the concept itself has been somewhat discredited. This may be attributed to the large number of e-Commerce failures during the e-Bubble era. The question that arises therefore, is whether these business failures could be attributed to poorly conceived business models, unsatisfactory IS, or a combination of both?
hypermedia, XML and active server pages (ASP), as well as conventional IS such as databases, transaction processing systems and management information systems. E-Commerce businesses use WIS integrated with conventional IS (Isakowitz et al., 1998:79). In this study, the term e-Commerce Information Systems (ECIS) is used to refer to this collective of WIS and conventional IS. Some of the common ECIS used by e-Commerce businesses are database management systems, order management systems, shopping cart systems, web content-management systems, e-mail management systems, electronic payment systems, financial management systems, and logistics management systems (Chaffey, 2002; Schneider, 2006).

The management of ECIS is not without unique challenges as they are considered to be different from IS used in brick and mortar businesses, in terms of their scope and focus (Zwass, 1996; Garrity et al., 2005). One issue, for example, is that e-Commerce businesses do not always have full control over the systems they have to use, as they also rely on IS that are developed by suppliers and intermediaries (Wang, 2001). Notwithstanding the various ECIS management challenges, the need for reliable ECIS in the e-Commerce environment is self-evident. This is appropriately summed up by Porter (2001:64), who proposes “the key question is not whether to deploy Internet technology…but how to deploy it”. The success of ECIS is therefore an important concern for e-Commerce managers. Since the advent of e-Commerce in the 1990s the interest in IS Success has gained prominence on the IS research agenda. When the e-Bubble burst, this interest intensified. In this period it was realised that large sums of money were being spent on ICT but with little evidence of e-Commerce success.
2.5 A history of the evolving impact of IS on business: from Automate beginnings to the Transfigurate era

The interest of researchers and business managers in the success of IS has been evolving since the first commercial deployment of computers. The history of how IS has impacted on business over the years, provides an important backdrop to the importance of this topic in the current Internet-dominated era.

Since the development of the first commercial computer in 1952,⁴ the deployment of IS has significantly altered the world of business. This can be attributed to the soaring power and declining costs of computer technology.⁵ The growth in investment in IS in the latter half of the twentieth century increased concerns of executives managing these resources (Hart et al., 2004). Much of the concern had to do with the benefits that were associated with IS. Managers had to justify the costs associated with IS, and thus questions pertaining to its success and the evaluation of its benefits came to the fore of the research agenda.

There are three phases that describe how our interest in IS Success has evolved over the years. These can be mapped against three distinct eras of IS application in business. Laudon and Laudon (2000:15-16) describe the evolution of these eras:

“*In the 1950s the effects of IS on organisations brought about merely technical changes, only serving to automate clerical procedures. During the 1960s and 1970s IS had an impact on managerial control, and from the 1980s onwards IS impacted upon core institutional activities such as products, markets, suppliers and customers.*”

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⁴ Although the history of computers indicates earlier inventions such as the Z1 Computer in 1936, the Harvard Mark I in 1944, and the ENIAC in 1946, the earliest indications of commercial activity can be attributed to the use of the UNIVAC which was used in 1952 to predict the outcome of the US elections.

⁵ This is sometimes referred to as Moore’s Law which, named after one of the founders of Intel, stated that semiconductor price/performance would double every two years (Willcocks & Graeser, 2001:195).
Zuboff (1988) labelled these phases as Automate, Informate and Transformate, and they are described as follows:

- **Automate phase**: focused on measurement of technical aspects of IT.
- **Informate phase**: also focused on technical aspects but with a shift towards evaluating the measurement of IS production or IS project management.
- **Transformate phase**: focused on measurement of business benefits with a shift towards a service perspective.

The Transformate era still reflects the impact of IS on organisations today. However, in considering the impact of the Internet on the business world, it is clear that organisations are going through a special kind of transformation. The Internet has a far-reaching impact on the way in which IS are being applied by businesses. The current era can therefore be thought of as being one of spectacular change or transformation. The term *Transfigurate* therefore more aptly describes the current Internet-dominant era, which is characterised by businesses that operate as global, Internetworked enterprises. Figure 2.3 summarises the salient aspects of IS benefits and measurement over the years in terms of the Automate, Informate, Transformate and Transfigurate eras.

*Figure 2.3 /*...
Chapter 2: IS Success: Principal Concepts, Theories And Models

**Four Phases of Impact of IS on Business**

<table>
<thead>
<tr>
<th>Automate</th>
<th>Informate</th>
<th>Transformate</th>
<th>Transfigurate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early IS impact line functions and are used to automate clerical tasks.</td>
<td>IS impact on managerial functions.</td>
<td>IS has impact on a wider scope of business issues including markets, suppliers, customers.</td>
<td>IS has a far-reaching impact on business, and the advent of the Internet changes fundamental business models.</td>
</tr>
<tr>
<td>Benefits affect aspects such as: Improved transaction processing; Greater reliability.</td>
<td>Benefits affect aspects such as: Improved production management; Improved sales forecasting.</td>
<td>Benefits affect aspects such as: Customer satisfaction; Impact on the organization; and Strategic value.</td>
<td>Benefits include those of the Transformate phase but go beyond these due to high levels of inter-networking.</td>
</tr>
<tr>
<td>Benefits are easy to identify and measure as they impact on clearly identified line functions. IS evaluation focuses on measuring technical aspects of applications.</td>
<td>Measurement of IS benefits become more difficult to measure as they have indirect impact through the management function. Evaluation focuses on measuring the production of IS.</td>
<td>Measurement of IS benefits now more complicated, due to the pervasive nature of interaction at all levels of business. Evaluation focuses on a wide variety of benefits.</td>
<td>Benefits are not clear, and therefore research into IS Success is necessary.</td>
</tr>
</tbody>
</table>


**Figure 2.3: Evolvement of IS benefits from the Informate phase to the Transfigurate phase**

The four phases described in Figure 2.3 can also be mapped onto the model developed by Scott Morton in 1991. During a study at the Massachusetts Institute of Technology (referred to as the Management in the 1990s or MIT90s study), a five-layer model that positioned IS at either an evolutionary or revolutionary level was developed (Scott Morton, 1991). The evolutionary level can be considered as the equivalent of systems that were characteristic of the Automate and Transformate eras, while the revolutionary level corresponds to systems in the Transformate and Transfigurate eras (Figure 2.4). The MIT90s
study brought about a change in the way IS was perceived, i.e., not as something in its own right but as a major facilitator of change to business processes (Bannister et al., 2006). Although the MIT90s model was developed fifteen years ago, the fourth and fifth layers of the model, especially, are relevant to e-Commerce businesses today. Both business network redesign and business scope redefinition are characteristic of IS-related practice of e-Commerce businesses.

![Image of IS Success: Principal Concepts, Theories And Models](image)

**Figure 2.4**: Automate, Informate, Transformate & Transfigurate mapped against the MIT90s model (Adapted from: Scott Morton, 1991)

Given the high investment in IS in the Transfigurate era, which has been catalysed by the commercial adoption of the Internet, it is timeous to review the various approaches that have been used over the years to evaluate IS Success. This necessitates a re-examination of the literature on IS Success through a new set of lenses, which takes into account the potential of IS to radically transform the modern inter-networked business.
2.6 Contextualising IS Success

The study of IS Success is not new, with papers dating back almost four decades, e.g., Boyd and Carson (1963), Gallagher (1974) and Lucas (1973). These studies were underpinned by a concern regarding whether the technology was being used in a successful manner. In determining what constitutes IS Success, researchers have employed a number of perspectives. These range from relatively simple accounting measures to multi-dimensional balanced score-card type metrics (Bannister et al., 2006).

In the post-e-Bubble era, business managers are now focused on how to gain optimal benefit from ECIS, and as such require appropriate performance metrics to evaluate ECIS Success (Barnes & Hinton, 2004). In the quest to develop ECIS success measures, researchers have argued that “the unique characteristics underlying the Web may in some cases require new metrics or at least the careful evaluation of existing ones” (Straub et al., 2002:117).

2.6.1 IS Success

Farhoomand and Drury (1996) define IS Success as the extent to which a system achieves the goal for which it was designed. For an IS to achieve the outcomes desired by a business, it should in the first instance be functional. In other words, as a product of systems analysis, systems design, and systems building activities, it is required to be in working order, i.e., there should not be a substantive number of bugs in the software, the system should produce timely and accurate information, the transmission of data over networks should occur without error, users should be satisfied with the outputs of the systems, etc. Consequently one view of IS Success is concerned with the functionality of the IS (Beynon-Davies et al., 2004). From this point of view, researchers have studied IS as a product (Whyte & Bytheway, 1996;
Lomerson & Tuten, 2005), as well as the processes involved in developing the system (Saleh & Alshawi, 2005).

However, having an operational IS is only one aspect of success. Another view focuses on the benefits that accrue to a business post-implementation of the system (Farbey et al., 1993). One of the important benefits expected from IS implementation is that of a positive financial return. However, not all benefits are tangible or easily susceptible to financial quantification (Willcocks & Graeser, 2001). There are several intangible benefits attributed to IS such as improved customer service, improved responsiveness, increased agility, enhanced quality of working life, etc. (Farbey et al., 1993). Although intangible, these constitute benefits for the business as well and as such ought also to be acknowledged as indicators of the success of IS.6

Based on the foregoing discussion, IS Success, in the context of this study, is defined as follows:

A successful IS favourably accomplishes the aims which underpin its conceptualisation and design. In a business context this implies that it should be able to consistently fulfil the business goals and objectives for which it was designed or purchased. Furthermore, a successful IS facilitates the accrual of both tangible and intangible benefits to the business.

2.6.2 Positioning the IS Success literature within a framework

The three views of success discussed in the preceding section have resulted in a plethora of ideas concerning IS Success and evaluation.7 As a result, there are various ways in which the literature could be

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6 IS benefits are discussed in further detail in Section 2.8.

7 Refer to DeLone and McLean (1992, 2003), Berghout and Remenyi (2005), for a synopsis of the divergent methods and approaches taken by researchers in this field.
Lee and Kozar (2006) aver that this field of study is divided into two categories. The first is concerned with how to develop methods for evaluating IS and IS benefits (e.g., Smithson & Hirscheim, 1998; Irani & Love, 2002; McAulay et al., 2002), and the second is to identify factors affecting IS Success (e.g., Seddon et al., 1999; DeLone & McLean, 1992). Studies that focus on methods, according to Saleh and Alshawi (2005), can be categorised according to the focus of the evaluation, viz., evaluating an IS as a product of systems development (e.g., system quality, system use, user satisfaction), or evaluating the processes which underpin the development of IS (e.g., goal-centred, comparative, improvement, normative).

In addition to the above, the literature has also focused on methods for identifying and quantifying the benefits of IS (Remenyi et al., 2000). The point at which IS evaluation is carried out has a bearing on the methods that are used (Farbey et al., 1999). Traditionally evaluation has occurred at two stages. Firstly, during the feasibility study (ex-ante evaluation), where forecasts are made of the impact of the new system, and secondly, a post-implementation evaluation (ex-post evaluation) after the system has been commissioned, to measure the actual impact (Smithson & Hirscheim, 1998). There are other suggestions that IS evaluation should be conducted a number of times during a project's life cycle (Remenyi et al., 2000). This includes evaluation during system planning, at the completion of design, after implementation, and during regular routine operations.

Using the foregoing discussion as a basis, the high-level phases of the systems development life cycle (SDLC) can be used as a basis of organising the extant IS Success literature into three streams (Figure 2.5) as follows:

- Firstly, there are studies that have focused on forecasting and evaluating the potential success or future impact of IS. In addition to
this, research has also been conducted on evaluating the methods used when developing IS (Box A).

- Secondly, other studies have examined the success of IS in a post-implementation perspective, i.e., success as a product of systems development. The main premise of these studies is to determine if the IS in use is achieving the desired outcomes for which it was designed or purchased (Box B).

- Thirdly, there are a number of studies that have focused on evaluating IS benefits. The assumption of these studies is that the primary purpose of IS implementation is to bring about some added value or benefits to the business. From this perspective, there are a number of papers that have investigated methods of identifying and evaluating such benefits or value in the post-implementation phase (Box C).

![IS SUCCESS STUDIES]

Figure 2.5: IS Success studies mapped against the SDLC

From the foregoing discussion three areas of IS Success have been highlighted, viz., (1) Indicators of successful development of the IS; (2) Indicators of a successful product, from an operational perspective; and (3) Indicators of positive business benefits.
2.6.3 The scope of IS Success in the context of this study

This study addresses the e-Commerce business environment, and the research questions are directed at identifying the factors that affect IS Success in B2C e-Commerce organisations. Given the foregoing discussion of the scope of the broader body of literature, Figure 2.6 below demarcates IS Success within the context of this study. This figure shows that the scope of the research questions locates this study in a post-implementation, business operational perspective.

![Figure 2.6: The context of IS Success within the scope of this study](image)

Following on Figure 2.6, the remainder of the literature review will focus mainly on studies that have examined the factors affecting IS Success, and the methods used to evaluate the success of the IS as product of systems development (refer to Box B of Figure 2.5). Additionally, so as to present a more comprehensive background to this topic, the discussion on IS Success factors, is preceded by a brief introspection of the reasons that motivate business managers’ interest in this field as well as the approaches to evaluating IS benefits (refer to Box A and C of Figure 2.5).
2.7 The business manager's interest in IS Success

When managers engage in control activities, they establish performance standards and develop mechanisms for gathering performance information in order to assess the degree to which standards are being met (Lewis et al., 2004). Koontz and Weihrich (1988) describe control as the act of measuring performance against goals and plans, in order to identify where negative deviations exist, and to put in motion actions leading to corrective measures. Wiggers et al. (2004:15) describe the planning and control cycle as follows:

“Based on the goals and the objectives of the managed unit, the activities need to be planned. For the execution of this planning all kinds of resources are used. In order to know whether the execution of the activities develops according to plan, this execution needs to be measured. After the analysis of the measurements, the management can change the planning, add more resources, etc.”

The questions what to measure and how to measure, i.e., the evaluation activities, therefore become fundamental to the control activity of management. Following on this, it is clear that in the first instance, the interest in IS Success stems from a requirement of managers to fulfil their duties by carrying out core management functions, in particular that of control (Serafeimidis & Smithson, 1999). It is worthwhile noting that the activities involved in evaluating IS Success, are the joint responsibility of both IS and business managers (Kohli et al, 2003).

The second, and perhaps far more important reason for assessing IS Success, is the high expenditure on IS infrastructure. With high expenditures on IS, it is therefore incumbent upon managers to be able to not only justify the expenditure when initiating new projects, but also to gauge the value that the business derives from IS. One of the reasons that the evaluation of IS Success is complicated and problematic is because there has been much speculation regarding exactly how value is gained from IS investments.
Despite widespread investment in IS, many academic researchers and industrial practitioners have questioned whether or not such investment adds value to organisations (Whyte et al., 1997; Seddon, et al., 1999; Lomerson & Tuten, 2005). In reference to investments in IS, Cotteleer (2004:2) asks:

“So how do we reconcile the demand on the part of firms, executives and shareholders to present a valid business case with the reality that almost no one believes the [value derived from the] work product that is eventually delivered?”

The questions around IS value gained much attention when the Nobel Laureate economist Robert Solow characterised the computer age by saying that “we see computers everywhere except in the productivity statistics” (Solow, 1987). This anomaly became known as the productivity paradox of information technology (Brynjolfsson, 1993). The view posited by Brynjolfsson was that although large sums were being invested in IS, there was no apparent increase in the productivity statistics. There were various reasons offered to explain this paradox, such as the “deficiencies in [the] measurement and methodological toolkit” and the “mismeasurement of outputs and inputs” (Brynjolfsson, 1993:66). The paradox problem was further compounded recently by Carr (2003), who suggests that IS has lost its capacity to offer competitive advantage. Over the years there have been a number of studies that supported the existence of a productivity paradox, e.g., Strassmann (1990), Atkinson and Court (1998) and Kohli et al. (2003). However, in 1996, Brynjolfsson and Hitt revisited the problem, and concluded that IS spending did indeed result in high returns (Brynjolfsson & Hitt, 1996; Hitt & Brynjolfsson, 1996). Thus a third reason that motivates business management’s interest in IS Success is to ensure that their investments yield appropriate returns in the form of increased productivity.

In summary, three reasons have been identified to support the interest in IS Success research:
Firstly, evaluation is one of four key management activities, and given the pervasive nature of IS in organisations today, it is not possible for managers to fulfil their duties if they ignore issues related to IS Success.

Secondly, given the ever-increasing investments in IS, managers are duty-bound to justify such expenditure. Clearly formulated evaluation plans will assist in making such justifications.

Thirdly, there has been speculation regarding how IS adds value to organisations. Further research regarding how IS Success should be evaluated will continue to uphold the view that IS investment does contribute towards increased productivity, as well as competitive advantage.

2.8 Evaluating IS Success: value, benefits, and financial approaches

There are various perceptions of the value that businesses derive from IS. The value placed in IS is seen to become higher as the use of IS in the organisation progresses from being just a facility to that of an enabler. Wiggers et al. (2004:5) use the IT Value Perception Model (Figure 2.7) to describe how managers perceive value, as follows:

“The maturity of IT supply deals with the professionalism and quality of the IT function in the organisation, with maturity being measured using a quality model such as the Capability Maturity Model (CMM). Maturity of IT demand refers to the self-awareness and self-consciousness of businesses to use and demand an appropriate level of quality from their IT supportive organisations. The IT value perception describes the perception of the executive management of the added value that IT delivers to the company”.

Figure 2.7/...
Over the years a number of approaches have been proposed to determine the value derived from IS. As described in Section 2.6, one component of the IS Success literature concerns evaluating benefits. There are a number of generic forms of IS benefits which can be categorised as strategic, management, operational, functional and support (refer to Figure 2.8).
In the discussion that follows, benefits are described as being either tangible or intangible. An overview is also presented of financial approaches to IS evaluation, in order to contrast this with other non-financial approaches discussed in subsequent sections.

2.8.1 **Tangible and intangible benefits**

The implementation of IS can result in a variety of benefits, some tangible, some intangible and even some unexpected benefits (Kohli *et al*., 2003). A tangible benefit is one which directly affects the firm’s profitability, whereas an intangible benefit is one which can be seen to have a positive effect on the firm’s business, but does not necessarily influence the firm’s profitability directly (Remenyi *et al*., 2000). Table 2.3 contrasts tangible and intangible IS benefits.

*Table 2.3/*
### Table 2.3: Examples of Tangible and Intangible IS benefits

(Adapted from: Remeny et al., 2000: 29-30, 152-153)

<table>
<thead>
<tr>
<th>IS Benefits</th>
<th>Tangible</th>
<th>Intangible</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Directly affects firm’s profitability)</td>
<td>(Has no direct affect on profitability)</td>
</tr>
<tr>
<td>Quantifiable (can be measured)</td>
<td>May be objectively measured; e.g. increase in revenue; reduction in costs</td>
<td>Difficult to measure objectively e.g. obtaining information faster; improved customer satisfaction</td>
</tr>
<tr>
<td>Unquantifiable (cannot be measured or more difficult to measure)</td>
<td>Precise impact on profitability cannot be measured, e.g. better information; improved security</td>
<td>Difficult to put a financial value to the benefit, e.g. increased customer confidence; customers or employees’ perception of the firms product.</td>
</tr>
</tbody>
</table>

From Table 2.3, we observe that benefits can be categorised according to the degree to which they may be quantifiable. However, there are several examples of both tangible and intangible benefits that are difficult to quantify.

Hitt and Brynjolfsson (1996) posit that the question of IS value is not a single one, but rather consists of several related but distinct issues. These are represented by the key questions around IS value, viz., have investments in IS:

- increased productivity, i.e., is there now more output per given quantity of input?
- improved business profitability, i.e., has the business been able to use IS to gain competitive advantage and earn higher profits than it would have earned otherwise?
- created value for consumers, i.e., what is the magnitude of benefits that have been passed on to the consumers?

The foregoing are examples of some of the fundamental questions that underpin our understanding of IS Success. The complexity of these approaches is dictated by the extent of the tangibility of the benefits, as well as the ease of measurement.
2.8.2 Using financial measures to evaluate IS benefits

Financial benefits are tangible and quantifiable. IS investments are often justified using financial measures. Examples of such approaches, according to Bills (2004), are Return on Investment (ROI), Net Present Value (NPV), Economic Value Added (EVA) and Real Option Valuation (ROV). These approaches essentially employ mathematical and statistical formulae to determine the potential financial returns from IS implementation.

There are also many financial measures that are used in the post-implementation phase (ex-post evaluation) which focus on evaluating the financial value of the business benefits that are attributed to IS. The main principle behind these approaches is that if the IS has resulted in benefits that can be attributed to high financial return, then the system can be considered as having been successful. Examples of benefits that have been investigated in ex-post IS evaluation studies are: sales revenue, labour productivity (Hitt & Brynjolfsson, 1996; Koski, 1999); profitability (Markus & Soh, 1993; Stoneman & Kwon, 1996); growth in revenues (Mahmood & Mann, 1993); and total costs to the business (Whelan & McGrath, 2002).

Aitken (2003) reports that 89% of companies have virtually no metrics in place except for finance. This is because these measures are attributed to benefits that are both easy to identify and measure using quantitative techniques. Some examples of financial benefits illustrated by Remenyi et al. (2000) are improved productivity, improved cash flow, and reduced bad debts.

2.9 IS Success: non-financial approaches

Although financially-based approaches to determining IS Success have been widely adopted, many companies are now finding this to be limiting
The use of financial measures only, has been criticised for not adequately addressing IS evaluation concerns (Irani & Love, 2002; Love et al., 2004). For example, Kumar (2004) observes that traditional financial evaluation techniques undervalue IS since they do not carefully consider relatively intangible benefits such as satisfaction of users. There is therefore a growing consensus amongst academics that the traditional view of financially driven, measurement-oriented evaluation, should be replaced by a form of evaluation that addresses a wider range of benefits (Doherty & McAuly, 2002). To this end, there have been various approaches to the evaluation of IS Success from non-financial perspectives.

The use of non-financial approaches does not imply that the measurement of financial benefits is not important. Rather, in addition to measuring financial benefits, there is also merit in evaluating how successful the IS is in terms of its ability to support the business objectives for which it was conceived, designed and implemented. Such studies have investigated aspects of the technical quality of the system, e.g., response time (Conklin et al., 1982; Srinivasan, 1985) and software architecture (e.g., Dobrica & Niemelä, 2002; Hamalainen et al., 2005). However, from an early stage, it has been noted that direct measures of assessing IS Success are difficult to develop (Galletta & Lederer, 1989). Therefore many researchers have identified surrogate measures that indirectly assess IS Success through the measurement of constructs such as user satisfaction (e.g. Bailey and Pearson 1983, Remenyi & Money, 1991; Hughes & Cooper, 2002; Shaw et al., 2002), and extent of system usage (e.g., Mahmood & Medewitz, 1985; Srinivasan, 1985; Trice & Treacy, 1986; Gelderman, 1998).

Researchers, however, have found empirical results in this area to be inconsistent, with a lack of overall synthesis across the numerous approaches to IS Success evaluation (Rai et al., 2002; Sabherwal, et al., 2004). This inconsistency and diversity in approaches led to a number of
attempts to bring about some coherence to the field by developing classifications of IS Success measures. The findings of four such studies are summarised in Table 2.4.

Table 2.4: Various classifications of IS Success measures

<table>
<thead>
<tr>
<th>Source</th>
<th>Classifications of IS Success measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zmud (1979)</td>
<td>• User performance</td>
</tr>
<tr>
<td></td>
<td>• User satisfaction</td>
</tr>
</tbody>
</table>
| Ives & Olson (1984)           | • System Quality                                     
|                               | • System acceptance: system usage, system impact on user behaviour, information satisfaction       |
| DeLone & McLean (1992)        | • System Quality                                     
|                               | • Information Quality                                |
|                               | • System Use                                         |
|                               | • User Satisfaction                                 |
|                               | • Individual Impact                                 |
|                               | • Organisational Impact                             |
| DeLone & McLean (2003)        | • System Quality                                     
|                               | • Information Quality                                |
|                               | • Service Quality                                    |
|                               | • Intention to Use                                   |
|                               | • Use                                                |
|                               | • User Satisfaction                                 |
|                               | • Net Benefits                                       |
| Saberwal, et al. (2004)       | • Contextual Factors:                                
|                               | • Top Management Support, IS Facilitating Conditions; Quality of ISD Team                          |
|                               | • User Related Factors:                             
|                               | • User IS experience, User attitude, User participation                                           |
|                               | • System success                                     
|                               | • System Quality, Perceived Usefulness, User Satisfaction, System Usage                           |

Of the studies listed in Table 2.4 the one by Delone and McLean (1992) has received much attention in the literature. The main output of this particular study, the IS Success Model, has been regarded by many authors, e.g., Molla and Licker (2001), as a major contribution and has been the focus of several investigations since 1992.
2.10 IS Success models

In an extensive review of 180 empirical studies, Delone and McLean (1992:61), concluded that “there are as many IS Success measures, as there are studies”. This prompted these authors to develop a more integrated view of the concepts of success. This resulted in the IS Success Model (Figure 2.9), which is described as a “taxonomy of IS success measures” with a number of inter-relationships that are drawn together in a model of six major “dimensions or categories of IS success” (Delone & McLean, 1992: 60-61).

An interpretation of the model is as follows:

“System Quality and Information Quality singularly and jointly affect both Use and User Satisfaction. Additionally, the amount of Use can affect the degree of User Satisfaction. Use and User Satisfaction are direct antecedents of Individual Impact; and this Impact on individual performance should eventually have some Organizational Impact”


Some of the important conclusions drawn by DeLone and McLean (1992: 87-88) were:

- the multidimensional and interdependent nature of IS Success requires careful attention with regard to the definition and measurement of each aspect of the dependent variable, IS Success;
the selection of success dimensions and measures should be contingent on the objectives of the empirical investigation; and
despite the multidimensional and contingent nature of IS Success, an attempt should be made by researchers to reduce significantly the number of different measures used to measure IS Success.

Since the publishing of the IS Success Model, it has been subjected to various challenges (e.g., Seddon, 1997), affirmations (e.g., Seddon & Kiew, 1996; Rai et al., 2002), and tests (e.g., Goodhue & Thompson, 1995; Etezadi-Amoli & Farhoomand, 1996; Igbaria & Tan, 1997; Roldán & Leal, 2003). In the period 1992 to 2003, nearly 300 articles in refereed journals have cited and critiqued the IS Success Model (DeLone & McLean, 2003:10). This is indicative of the importance attributed to this model by the IS academic community. The IS Success Model is also used by the Association of Information Systems’ (AIS) special interest group for IS Effectiveness. It appears on their website as a framework for organising an online repository of material on IS Success.

### 2.10.1 Process versus variance models

One important challenge to the IS Success Model, concerned the combining of a process and variance model (Seddon, 1997). Markus and Soh (1993) posit that although variance theories excel at explaining variations in the magnitude of a certain outcome, they tend not to do well in situations where the outcome is uncertain. In contrast, process theories can provide powerful explanations even when causal agents cannot be demonstrated to be sufficient for the outcome to occur. Seddon’s viewpoint is that the boxes and arrows in variance and process models represent quite different concepts and cannot be combined meaningfully in one model, and thus the IS Success Model was problematic in this regard. He further posits that the inclusion of both

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8 See [http://www.ais.org](http://www.ais.org)
variance and process interpretations in the IS Success Model “leads to many potentially confusing meanings” (Seddon, 1997:240). Table 2.5 contrasts process with variance theories.

### Table 2.5: Differences between variance theories and process theories
(Source: Markus & Soh, 1993:31)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Variance Theory</th>
<th>Process Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcome</td>
<td>A variable</td>
<td>A discrete occurrence</td>
</tr>
<tr>
<td>Logical form</td>
<td>If X (independent variable, necessary and sufficient conditions), then Y (dependent variable); if more X, then more Y.</td>
<td>If not-X (necessary conditions), then not-Y (outcome); cannot be extended to “more X” or “more Y”.</td>
</tr>
<tr>
<td>Assumptions</td>
<td>Outcome will invariably occur when necessary and sufficient conditions are present.</td>
<td>Outcomes may not occur even when conditions are present unless a particular “recipe” involving external directional forces and probabilistic processes unfolds.</td>
</tr>
<tr>
<td>Role of time</td>
<td>Irrelevant; necessary and sufficient conditions can occur in any order.</td>
<td>Crucial; the time ordering in which necessary conditions combine is consequential.</td>
</tr>
<tr>
<td>How to “read” the theory</td>
<td>The cause is necessary and sufficient to produce the effect.</td>
<td>Causation consists of necessary conditions occurring in a particular sequence in which change and random events play a role.</td>
</tr>
</tbody>
</table>

In response to this criticism, DeLone and McLean (2003:16) argue that it is possible to combine both process and variance dimensions into one model. They explain that as a process model there are three components of the IS Success Model, viz., the creation of a system, the use of the system, and the consequences of the system use. However, each of these steps is a necessary but not sufficient condition for the resultant outcomes, e.g., without system use, there can be no consequences or benefits. As a variance model, there are three components of the IS Success Model, viz., production, use, and net
benefits. For example, higher system quality is expected to lead to higher user satisfaction and use, leading to positive impact on individual productivity, resulting in organisational productivity improvements (DeLone & McLean, 2003:11).

2.10.2 The unit of analysis in IS Success studies

Another important criticism of the IS Success Model concerns the unit of analysis. Seddon et al. (1999) argue that although there are a large number of measures in the literature, the units of analysis have received little attention. In addressing this problem, they propose a two-dimensional matrix for classifying IS Success measures. They name the first dimension as Stakeholder, which includes an independent observer, individual, group, management, and a country. The second dimension is called System, and includes the following:

- An aspect of IT use, e.g., a single algorithm or form of user interface.
- A single IT application, e.g., a spreadsheet, a cataloguing system.
- A type of IT or IT application, e.g., TCP/IP, a GDSS, a TPS, etc.
- All IT applications used by an organisation or sub-organisation.
- An aspect of a system development methodology.
- The IT function of an organisation or sub-organisation.

(Seddon et al, 1999:6).

By classifying IS Success measures using these two dimensions in a two-by-two matrix, Seddon et al. (1999) derived 30 possible classes of measures, each representing a particular unit of analysis for an IS Success study. The importance of this study is that it brings to light how subtle differences in stakeholder perspectives can produce significantly different evaluations of systems. The study therefore adds value to our understanding of how to go about evaluating by emphasising the significance of two important issues. Firstly, researchers ought to clearly identify the stakeholders in whose interest the IS evaluation is being
conducted. Secondly, the type of system being evaluated should be clearly identified and understood. These two simple, but nevertheless important perspectives, can assist researchers to more accurately define the unit of analysis of the study.

2.10.3 Updates to the IS Success Model

Given the widespread use of the IS Success Model in a number of different studies since 1992, an update to the model (Figure 2.10), was recently proposed. Important modifications to the initial model included:

- The Quality construct of IS Success was extended to include Service Quality.
- The construct Systems Use was found to be multi-dimensional, e.g., mandatory versus voluntary use. As a result, Intention to Use was added to the model, to differentiate between Systems Use as a behaviour as opposed to Intention to Use as an attitude.
- The constructs of Individual Impact and Organisational Impact were collapsed into a single dimension named Net Benefits.


![Figure 2.10: The updated IS Success Model](Source: DeLone & McLean, 2003:24)
In addition to the improvements described above, the authors also suggest that the updated model provides “a parsimonious framework to organise the various success metrics identified in the IS and e-commerce literature (DeLone & McLean, 2003:25).”

Other models of IS Success that have been identified in the literature include the Garrity and Sanders model of IS Success (Garrity & Sanders, 1998), the Hierarchical Model of IS Success (Drury & Farhoomand, 1998), the Technology Acceptance Model (Davis, 1986), the E-Commerce Success Model (Molla & Licker, 2001), and the Web-Based Information Systems Success Model (Garrity et al., 2005). However, besides the Technology Acceptance Model, all the other models have used the IS Success Model (DeLone & McLean, 1992) as an underpinning framework. This is indicative of the wide acceptance of this model. In the light of this, the IS Success Model is a useful framework to guide a discussion on some of the more common approaches to the evaluation of IS success.

2.11 The user-satisfaction dimension of IS Success

The user-satisfaction approach to IS Success has been widely published, and several standardised instruments have been developed over the years, e.g., Ives et al. (1983), Bailey and Pearson (1983), Baroudi and Orlikowski (1988), Doll and Torkzadeh (1988), Miller and Doyle (1987), Remenyi and Money (1991) and Shaw et al. (2002). The comprehensive review of literature conducted by Delone and Mclean in 1992 and 2003 (Delone & McLean, 1992; Delone & McLean, 2003) revealed that user satisfaction was the most widely used measure of IS Success. User satisfaction has also been widely used to measure IS

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9 This proposition is explained in further detail in a subsequent paper (Delone & McLean, 2004), which specifically deals with e-Commerce and IS Success.

2.11.1 \textit{The origins of user-satisfaction research}

User-satisfaction research can be traced back to the 1980s. Studies in this era have been synthesized into three perspectives by Kim (1989:2-3). These are user satisfaction in terms of \textit{attitudes} (Lucas, 1973; Bailey & Pearson, 1983; Ives \textit{et al}, 1983; Miller & Doyle, 1987); user satisfaction in terms of \textit{information quality} (Gallagher, 1974; King & Epstein, 1983; Jenkins & Ricketts, 1985) and user satisfaction in terms of \textit{organisational effectiveness} (Schultz & Slevin, 1975; Sanders, 1984).

The pioneering work of user satisfaction, in terms of attitudes, was produced by Bailey and Pearson (1983) with the development of a 39-item questionnaire for measuring perceived user satisfaction with IS. This was subsequently the focus of several studies such as Ives \textit{et al.} (1983), Treacy (1985), Galletta and Lederer (1989), and Baroudi and Orlikowski (1988), which offered various critiques of the Bailey and Pearson instrument. These studies provided a strong foundation for continued research in this area. Papers, based on various adaptations of this construct, continued to be published in the 1990s up to the current era.

2.11.2 \textit{User satisfaction in e-Commerce business}

None of the literature reviewed used the term “user satisfaction” as a construct for evaluating IS Success. However, terms such as “customer

\textsuperscript{10} Although the term \textit{User satisfaction} is not used per se in the e-Commerce literature, it has been acknowledged that the online customer is simultaneously an IT-user (Koufaris, 2002). Therefore studies that have investigated customer satisfaction with websites are representative of user-satisfaction studies in the e-Commerce literature.
e-commerce satisfaction” (Molla & Licker, 2001) and “customer satisfaction” (Feinberg & Kadam, 2002) align closely with the user-satisfaction dimension of IS Success.

Delone and McLean (2004), in their review of the e-Commerce literature, found that there were no specific instruments for measuring user satisfaction. This is as a result of taking a narrow view of the user-satisfaction construct. Such a view is rooted within the definitions of the traditional computer end-user. A more open mind to the utilisation of the user-satisfaction dimension of IS Success is required in the e-Commerce context. This is closely related to the service quality dimension of IS Success.

2.12 Service quality: an adaptation of the user-satisfaction dimension of IS Success

Service quality can be defined as “the difference between customers’ expectations for service performance prior to the service encounter and their perceptions of the service received” (Asubonteng et al., 1996:64). Gefen (2002) defines service quality as the subjective comparison that customers make between the quality of the service that they want to receive and what they actually get. Table 2.6 describes the evolvement of a service perspective in the IS Success literature.

*Table 2.6/*...
Table 2.6: Perspectives of IS Success  
(Adapted from: Whyte & Bytheway, 1996:75-77)

<table>
<thead>
<tr>
<th>THREE PERSPECTIVES OF IS SUCCESS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PRODUCT</strong></td>
</tr>
<tr>
<td>The product which is delivered to the users, e.g., actual software</td>
</tr>
<tr>
<td><strong>PROCESS</strong></td>
</tr>
<tr>
<td>The process that creates the system, e.g., RAD approach, end-user approach, etc.</td>
</tr>
<tr>
<td><strong>SERVICE</strong></td>
</tr>
<tr>
<td>Deals with softer issues, e.g., answering questions, dealing with problems, addressing concerns of users.</td>
</tr>
</tbody>
</table>

It is argued that early IS research has chosen to deal with the product viewpoint, focusing on the more tangible attributes and characteristics of systems products, such as response times, data volumes and extent of system usage.

|osomal point of view. The studies concentrated on the more tangible attributes such as the number of errors occurring within the process, the level of user involvement and the milestones at which user approval is given. |

| The emergence of a service perspective introduces the idea of evaluating end-users’ perceptions of IS Success. |

2.12.1 Background to service quality and its prominence in the IS Success literature

Kim (1991) was one of the first researchers to introduce a service perspective of IS Success. Kim’s gap model (Figure 2.11), which provides a conceptual framework for user-satisfaction measurement, has its roots in consumer-satisfaction research. 

*Figure 2.11/*...
The intellectual basis of Kim’s model, which is derived from studies conducted by Parasuraman et al. (1985, 1988), is based on the SERVQUAL model. SERVQUAL uses a five-dimensional scale (Tangibles, Reliability, Responsiveness, Assurance, Empathy) to measure customers’ expectations and perceptions of service quality (Parasuraman et al., 1988:25). A number of investigations have attempted to refine and improve SERVQUAL (Carman, 1990; Finn & Lamb, 1991; Babakus & Mangold, 1992). SERVQUAL, which is widely cited in the marketing and retailing literature, has been applied in varying organisational settings, e.g., the car-service industry (Bouman & Van der Wiele, 1992), local government (Donnelly et al., 1995), and the health sector (Curry & Sinclair, 2002).

Kim’s model made an important contribution to the user-satisfaction literature in that it introduced the measurement of both user expectations and perceptions of IS service. The relevance of both expectations as well as perceptions of IS service took into account the deficiency of research into user satisfaction in the period up to the end of the 1980s (Kim, 1991: 184-185). One of the significant problems that Kim
highlighted was that prior research focused only post-implementation phenomena. He concluded that user expectations also play an important role in determining satisfaction.

The gap model forms the basis of the next era of user-satisfaction measuring scales. Even though there have been criticisms regarding the use of gap measurement (Cronin & Taylor, 1992; Van Dyke et al., 1997), there is ample evidence to support such an approach for measuring satisfaction with IS services (Remenyi & Money, 1991; Kettinger and Lee, 1994, 1997; Pitt et al., 1997; Watson et al., 1998; Jiang et al., 2002; Gefen, 2002).

Remenyi and Money (1991) were the first researchers to use Kim’s service-oriented perspective of IS Success to design a user-satisfaction measuring instrument based on both user expectations and perceptions. The primary tenets of instruments such as this are:

- the IS function is a service function and consequently the attitudes of the user are a credible indicator of effectiveness; and
- the gap between users’ expectations of the IS service, and the actual delivered service provides a basis for measuring user satisfaction.

In 1997, Pitt et al. proposed that the IS Success Model be adapted to include a Service Quality component. This modification was subsequently endorsed by the original authors of the IS Success Model (DeLone & McLean, 2003).

2.12.2 Service Quality: an approach to evaluating user satisfaction in the e-Commerce Environment

Service Quality research underpins a large number of studies in the e-Commerce literature. These studies address the measurement of both IS system quality (e.g., Cody & Hope, 1999; Chang & King, 2005) as
well as the general use of the website (e.g., Zeithaml, 2002; Lee & Lin, 2005; Parasuraman et al., 2005). In the case of the latter, most of the studies deal with how effectively service quality is delivered through the website. Thus from the point of view of the IS Success Model, service quality research can be categorised under the IS Success dimension of use, as well as user satisfaction.

![Figure 2.12: The evolvement of a new type of end-user in e-Commerce](image)

A distinct feature of the e-Commerce environment is that the characteristics of the traditional end user of IS have changed considerably. According to Cheon et al. (1993), the variables Use and User satisfaction have been located in traditional research models within the brick and mortar organisational environment. Within this environment, the role of the end user of IS has evolved in a manner in keeping with the changing nature of computing. With the advent of e-Commerce, users of IS are now located out of the physical domain of the business (Figure 2.12). These IS users are different in the sense that they are not performing a role within the organisation, but are merely interacting with the business through its website, with the possible intention to conduct a transaction. In the light of this, Han and Han (2001) conclude that previous research on user satisfaction may not necessarily be applicable to the e-Commerce environment.
The new role of the end user raises the question of whether the scales developed for measuring user satisfaction to date are valid. Molla and Licker (2001) argue that while both the popular and academic literature promise many benefits to be derived from e-Commerce systems, these claims are not widely supported by empirical data. They also point out that although use and user satisfaction are the most widely utilised dependent variables in the e-Commerce literature, standard and systematic criteria for assessing these variables have not been developed. The conceptual paper of Molla and Licker proposes an adaptation of the IS Success Model by defining an independent variable named “Customer E-commerce Satisfaction” (Molla & Licker, 2001:6). According to these authors the use of this variable provides an appropriate surrogate for assessing e-Commerce success.

2.12.3 Service Quality: An approach to evaluating the IS function in e-Commerce business

Another distinct feature of the e-Commerce environment is that the business primarily offers its products or services by using ECIS, viz., the website and the associated applications that run on both the client and server side. This implies that an assessment of the customer’s interaction of the business through its website, is inherently also an assessment of products delivered by the IS function of the e-Commerce business.11 Zhu & Kraemer (2002) assert that since customers are the end-users of IS-based services, it is their perception of service quality that matters most.

However, even though there are a number of studies that investigated service quality in the e-Commerce environment (e.g., Zeithaml et al.,

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11 In the IS literature, service quality concepts have been used to assess the IS function as a service provider (e.g. Pitt et al. 1995; Pitt et al., 1997; Jiang et al., 2002).
2002; Cox & Dale, 2001; Zeithaml, 2002; Parasuraman et al., 2005), these have focused mainly on evaluation constructs associated with marketing. This points to a gap in the literature regarding how service quality concepts can be extended to the evaluation of the IS function within an e-Commerce context.

Table 2.7 summarises some of the e-Commerce studies that are relevant to IS Success evaluation, from a user-satisfaction perspective. The summary of findings in this table shows that some e-Service Quality studies, which were found mainly in the Marketing literature, are pertinent to the evaluation of both the user-satisfaction and systems quality (website) dimensions of IS Success. In particular, these studies reinforce the relationships between service quality and systems quality with that of user satisfaction. This is indicative that there is a convergence of multi-disciplinary themes in the evaluation of ECIS Success.

<table>
<thead>
<tr>
<th>Source</th>
<th>Main Findings</th>
<th>Relevance to IS Success Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zeithaml (2002)</td>
<td>The study presents a conceptual model for understanding service quality. The model demonstrates the relationship between website design and customer perceptions of service quality.</td>
<td>Combined User satisfaction, Service Quality</td>
</tr>
</tbody>
</table>

Contd/…
<table>
<thead>
<tr>
<th>Source</th>
<th>Main Findings</th>
<th>Relevance to IS Success Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doolin et al. (2005)</td>
<td>A research model is developed demonstrating the importance of customer’s perceived risk and Internet shopping experience with online purchasing behaviour.</td>
<td>User satisfaction</td>
</tr>
<tr>
<td>Lee &amp; Lin (2005)</td>
<td>A research model is developed to examine the relationship between e-service quality and customer satisfaction. Customer satisfaction is dependent on: Website design, Reliability, Responsiveness, Trust, Personalization</td>
<td>Combined User satisfaction, Service Quality, and Systems Quality</td>
</tr>
</tbody>
</table>

### 2.13 The systems quality dimension of IS Success

The systems quality dimension of success is concerned with performance characteristics of the IS being studied (Grover et al., 2005). Sabherwal et al. (2004) define this dimension as the quality of the system and the information it provides, in terms of the system's reliability, ease of use, response time, as well as the relevance, timeliness and accuracy of the information. Another definition of systems quality refers to the performance of the system in delivering information (DeLone & McLean, 1992). In general, the systems quality dimension of IS Success tends to focus on the technical nature of the system as opposed to the impact the system has on its users (user satisfaction) or the business (net benefits). From the IS Success Model perspective, systems quality is considered as one of the antecedents of IS Success.
2.13.1 Dimensions of Systems Quality

The IS Success literature consists of a number of studies that have focused on Systems Quality. Table 2.8 provides an overview of systems quality dimensions that have been identified in the literature by Nelson et al. (2005).

Table 2.8: Systems Quality Dimensions

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accessibility</td>
<td>The degree to which a system and the information it contains can be accessed with relatively low effort.</td>
</tr>
<tr>
<td>Reliability</td>
<td>The degree to which a system is dependable (e.g. technically available) over time.</td>
</tr>
<tr>
<td>Response Time</td>
<td>The degree to which a system offers quick (or timely) responses to requests for information or action.</td>
</tr>
<tr>
<td>Flexibility</td>
<td>The degree to which a system can adapt to a variety of user needs and to changing conditions.</td>
</tr>
<tr>
<td>Integration</td>
<td>The degree to which a system facilitates the combination of information from various sources to support business decisions.</td>
</tr>
</tbody>
</table>

In another study Stylianou and Kumar (2000) identified six dimensions of systems quality, viz., infrastructure quality, software quality, data quality, information quality, service quality, and administrative quality. Table 2.9 shows how these dimensions are operationalised according to specific systems processes.
Table 2.9: System quality attributes and metrics for IS processes
(Source: Stylianou & Kumar, 2000:103)

<table>
<thead>
<tr>
<th>Process</th>
<th>Attributes</th>
<th>Metrics</th>
<th>Quality Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systems Development</td>
<td>Cost</td>
<td>$ per hour, $ of person hours</td>
<td>Administrative Quality</td>
</tr>
<tr>
<td>Time</td>
<td>Days</td>
<td></td>
<td>Administrative Quality</td>
</tr>
<tr>
<td>Bugs</td>
<td># of system crashes, # of minor faults</td>
<td></td>
<td>Data Software, Infrastructure quality</td>
</tr>
<tr>
<td>Ease of use</td>
<td># of requests for help, learning time</td>
<td></td>
<td>Information Quality</td>
</tr>
<tr>
<td>System Maintenance</td>
<td>Ease of fixing problems</td>
<td>Response time for maintenance requests</td>
<td>Service Quality</td>
</tr>
</tbody>
</table>

Over the years studies have focused on a variety of different evaluation constructs for IS Quality. Hamilton and Chervany (1981) advanced an evaluation scheme that comprised the following components: data currency, response time, turnaround time, data accuracy, reliability, completeness, system flexibility, and ease of use. In comparison, Srinivasan (1985) identified response time, system reliability, and system accessibility as appropriate measures for this dimension of success. In another study, Seddon (1997) considered system quality to be concerned with bugs in the system (system reliability), user interface consistency, ease of use, documentation quality, and quality and maintainability of the program code.

More recently, Whitworth et al. (2005:94-95) identified eight dimensions of Systems Quality. These are: extendibility (the system’s ability to make use of outside elements); security (the ability of a system to protect itself against unauthorised entry); flexibility (a system’s ability to work in new environments); reliability (the ability of a system to keep operating despite internal changes like stress and load); functionality (the system’s ability to act directly on its environment to produce a desired change); usability (a system’s ability to minimise the relative resource costs of action); connectivity (a system’s ability to communicate with other systems); and privacy (a system’s ability to control the release of information about itself).
2.13.2 Systems quality in the e-Commerce environment

Systems quality research in the e-Commerce literature has focused mainly on the web-interface. DeLone and McLean’s definition of system quality supports this assertion:

“System quality in the Internet environment, measures the desired characteristics of an e-commerce system. Usability, availability, reliability, adaptability, and response time (e.g. download time) are examples of qualities that are valued by users of an e-commerce system”


Delone and McLean (2004) have attempted to demonstrate that the IS Success Model can be applied in the e-Commerce environment. By using two case studies, these authors suggest that dimensions of systems quality that could be applied in the e-Commerce environment are usability (website should be easy to use), availability (of the website), and download time. A number of other e-Commerce studies also focused on the system quality dimension of web sites. For example, McKinney et al. (2002) identified a number of constructs for measuring e-Commerce Success. These were access (responsiveness, quick loads), usability (or ease of use of the website), and navigation (easy to go back and forth, number of clicks). Lee and Kozar (2006:6), also focused on the website, by using the following constructs for evaluation:

- **navigability**: the website’s capability to provide alternative interaction and navigating techniques;
- **response time**: the time taken to respond to page and information requests;
- **personalisation**: provision of an individualised interface, effective one-to-one information and customised service;
- **telepresence**: the sense of reality created in the virtual environment; and
- **security**: encryption, third-party affiliations, etc.
Palmer (2002:157) also investigated website quality, and identified the following success constructs: download delay (initial access speed, speed of display between pages), navigation (arrangement, sequence, links, layout), and interactivity (customisation). Liu and Arnett (2000) measured system quality by using six variables, viz., processing speed, quick error recovery, correct operation and computation, security, balanced payment method between security and ease of use, and coordination to support all functional areas. Other systems quality measures identified in the e-Commerce literature include systems responsiveness and response-time (Molla & Licker, 2001; Tiwana, 1998), privacy and security (Molla & Licker, 2001), search facilities, responsiveness, and multimedia capability (Cao et al., 2005).

In all of the studies discussed above, systems quality investigations have focused mainly on aspects of website design. There are no studies that deal with the quality attributes of back-end systems such as the database, order processing systems, and logistics management systems. This points to a serious gap in the literature, given that the focus on the web-interface only has tended to dilute our understanding of overall IS quality in the e-Commerce environment. Further research is required to investigate systems quality within a broader context so as to include other systems that comprise ECIS.

2.14 Theories underpinning IS Success studies

In reviewing the IS Success literature, no dominant theoretical perspective was found. Nor is there an abundance of citations of the so-called grand theories. In cases where theories have been used to underpin research models and hypotheses, these were adapted from other disciplines. Examples were Communications Theory (Shannon & Weaver, 1949), Resource-Based Theory (Penrose, 1959), and Theory of Reasoned Action (Fishbein & Ajzen, 1975).
DeLone and McLean (1992) used the theory of communication (Shannon & Weaver, 1949) as the theoretical underpinning of the IS Success Model, by taking the view that an IS is also a communication system. The IS Success Model was thence conceptualised using Shannon and Weaver's three levels of a communication system, viz., the technical, semantic and effectiveness levels. Besides the DeLone and McLean study, the theory of communication was not used in other research, except by indirect citation of the Delone and McLean (1992) paper. The IS Success Model itself has been used as a theoretical underpinning in several studies since 1992.

The Technology Acceptance Model (TAM) is a widely referenced theoretical model in the IS literature for predicting intention to use and acceptance of IS by individuals (Devaraj et al., 2002). The TAM model, developed by Davis (1986, 1989), is derived from the Theory of Reasoned Action (Fishbein & Ajzen, 1975). In terms of this model, perceived ease of use, and perceived usefulness determine the attitude toward an IS. The attitude, in turn, leads to one’s intention to use an IS and the eventual acceptance of the system (Davis et al., 1989). The TAM model has been used in a number of studies that investigated the use of web-based IS (e.g., Gefen & Straub, 2000; Lederer et al., 2000) and web-based IS Success (e.g., Garrity et al., 2005).

The resource-based theory posits that firms create performance advantages by assembling resources that work together to create organizational capabilities (Penrose, 1959). The theory assumes that a firm’s performance is founded on its capabilities, i.e., its resources and its competitors’ difficulty in imitating them (Zhuang & Lederer, 2006). In the IS literature, the resource-based view has been used to explain how firms can create competitive value from IS assets, and how sustainability resides more in the organisation’s skills to use IS than in the technology itself. IS payoffs depend heavily on fitting the pieces together, i.e., on
exploiting relationships among complementary resources (Zhu & Kraemer, 2002). Resource-based theories have been referred to in several studies, e.g., Clemons and Row (1991), and Bharadwaj (2000). Zhu and Kramer (2002) aver that the resource-based view provides a solid theoretical foundation for studying the contexts and conditions under which e-Commerce may produce performance gains.

In summary, because of fragmentation in the IS Success body of knowledge, there are no consistent trends in the application of theories. Instead, a number of different theories are applied. For example, Sabherwal et al. (2004) use a combination of six theoretical areas to develop their research model.\textsuperscript{12} Furthermore, there are no dominant grand theories. The three theories summarised in the foregoing paragraphs are presented solely for the purpose of providing some examples of the types of theoretical underpinnings of IS Success studies found in the literature. In the next section, an overview of a selection of studies is presented. From this, a better understanding can be obtained of the application of theory in the IS Success literature.

2.15 Pre- and post- e-Commerce IS Success studies: a comparative analysis

The body of literature pertaining to IS Success is an expansive one. The main purpose of this section is to present an overview of the research that is pertinent to this domain. A sample of fourteen studies that deal with IS Success in e-Commerce environments, and ten pre- e-Commerce studies was chosen for the comparative analysis. These studies are summarised and contrasted with one another in respect of theoretical underpinnings, findings, and stakeholder evaluative perspectives.

\textsuperscript{12} The theories used by these authors were: expectancy theory, theory of reasoned action, theory of planned behaviour, technology acceptance model, social cognitive theory, and innovative diffusion theory.
The columns in Tables 2.10 and 2.11 are organised as follows:

- **Source:** These are listed in chronological order.
- **Main findings:** These are summarised.
- **Stakeholder / IS Success dimension:** Using the IS Success Model as a basis (DeLone & McLean, 1992, 2003), the third column identifies the IS Success dimensions that each of the studies deals with. Additionally, based on Seddon and co-authors’ respecification of the IS Success Model (Seddon et al., 1999), the relevant stakeholder involved in undertaking the evaluation is identified.
- **The last column indicates what major theory, if any, was used to underpin the study.**

_Table 2.10/…_
## Table 2.10: A sample of IS Success studies (pre-e-Commerce)

<table>
<thead>
<tr>
<th>Source</th>
<th>Main findings</th>
<th>Stakeholder IS Success Dimension</th>
<th>Theoretical Foundation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IS Success Studies: Pre-Commerce</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Davis (1989) | Developed the Technology Acceptance Model (TAM). Postulates that Technology Usage is determined by Behavioural Intention to use the technology, which in itself is determined by Perceived Usefulness and Attitude. Perceived Ease of Use and Perceived Usefulness are primary determinants of Systems Use. | • End user  
• Systems Use | Theory of Reasoned Action. |
| Drury & Farhoomand (1998) | Develops a hierarchical structural model of IS Success. Five dimensions of success are identified and tested: System Characteristics, Output Quality, Systems Outcomes, User Requirements, and Inter-corporate Outcomes. | • Organisational view of Success  
• Multi-dimensional IS Success categories | No major theory discussed. Model is derived from analysis of prior studies. |
| Seddon et al. (1999) | A two dimensional matrix, with 30 possible units of analysis for IS evaluation is proposed. The model is based on two major dimensions of IS Success, viz., The IS stakeholder interest in evaluation and a System Dimension. | • Multi-stakeholders  
• Multi-dimensional | No major theory discussed. Model is derived from analysis of prior studies. |
| DeLone & McLean (1992) | Based on Communication Theory, and an analysis of empirical studies, an IS Success Model is derived based on 6 dimensions: Information Quality, Systems Quality, Information Use, User satisfaction, Individual Impact, and Organisational Impact. | • Multi-stakeholders  
• Multi-dimensional IS Success categories | Communication Theory |
| Whyte & Bytheway (1996) | Based on service management constructs, a set of 21 attributes to measure IS Success is developed. Argues that these attributes can be incorporated into a routine method for assessing the level of service provided by an IS department. | • End user  
• Service Quality. | No major theory discussed. Research model is derived from previous studies |
### IS Success Studies: Pre-Commerce

<table>
<thead>
<tr>
<th>Source</th>
<th>Main findings</th>
<th><strong>Stakeholder IS Success Dimension</strong></th>
<th><strong>Theoretical Foundation</strong></th>
</tr>
</thead>
</table>
▪ Multi-dimensional IS Success categories                | Theory of planned behaviour and TAM.                        |
| Roldan & Leal (2003)    | The authors apply the D&M IS Success Model to the EIS environment. Findings show that system quality and information quality affect use of EIS as well as user satisfaction. Furthermore use and user satisfaction have an impact on the individual user in terms of: speed of problem identification, speed of decision-making, and extent of analysis. The impact on individual users has a similar effect on the organisation in terms of: shared organisational vision, organisational decision-making effectiveness; perceived organisational performance. | ▪ End-user perspective.  
▪ System Quality, Information Quality and User satisfaction. | No major theory discussed. Investigation based on IS Success Model. |
| Sabherwal et al. (2004) | Based on a study of 115 papers published between 1980 and 2003, provides a comprehensive understanding of IS Success dimensions and determinants. The model explains interrelationships among four success factors (user satisfaction, system use, perceived usefulness, system quality), and their relationships with three user-related factors (user experience, user attitudes, user participation) and three contextual factors (top management support, quality of IS development team, facilitating conditions. | ▪ Multi-stakeholders  
▪ Multi-dimensional IS Success categories                | Combined theoretical approach: Expectancy theory, theory of reasoned action; theory of planned behaviour; social cognitive theory; innovative diffusion theory |
### IS Success Studies: Pre-Commerce

<table>
<thead>
<tr>
<th>Source</th>
<th>Main findings</th>
<th>Stakeholder IS Success Dimension</th>
<th>Theoretical Foundation</th>
</tr>
</thead>
</table>
| De Guinea et al. (2005)  | In a study of 115 small businesses in Canada, the authors test the relationships between 3 constructs (managerial support, consultant effectiveness, vendor support) with user satisfaction, organisational impact, overall IS effectiveness and intention to expand. The study finds that both managerial support and vendor support are essential for effective IS in Canadian small business. | Multi-stakeholders  
User satisfaction  
Organisational impact | No major theory discussed. Investigation based on IS Success Model. |
| Nelson et al. (2005)     | Presents a model consisting of nine determinants of information quality and system quality:  
*Information Quality:* Completeness, Accuracy, Format, and Currency.  
*System Quality:* Reliability, Flexibility, Accessibility, Response Time, and Integration.  
The research further finds a relationship between Information and Systems Quality with Information and System Satisfaction. | End-user  
Information Quality  
System Quality. | No major theory discussed. Research model is derived from previous studies. |

Table 2.11 /…
### Table 2.11: A sample of IS success studies from the e-Commerce literature

<table>
<thead>
<tr>
<th>Source</th>
<th>Main findings</th>
<th>Stakeholder Dimension</th>
<th>Theoretical foundation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barnes &amp; Vidgen (2001)</td>
<td>Using service quality constructs, proposes a 24-item scale to measure website quality. Website-related constructs are developed for the 5 dimensions of the SERVQUAL model (Tangibles, Reliability, Responsiveness, Assurance, Empathy).</td>
<td>End user (customer perspectives)</td>
<td>No major theory discussed. Model is derived from prior studies on service quality.</td>
</tr>
<tr>
<td>Molla &amp; Licker (2001)</td>
<td>A theoretical study that derives a re-specified IS Success Model. The resultant e-Commerce Success model uses “Customer e-Commerce Satisfaction” as the dependent variable, which in turn is affected by the constructs of: System Quality, Content Quality (on Website), Use, Trust, Support and Service.</td>
<td>End user perspective.</td>
<td>No major theory discussed. Model is derived from analysis of prior studies.</td>
</tr>
<tr>
<td>Chen &amp; Hitt (2002)</td>
<td>The study of the online brokerage industry examines how website quality viz., ease of use, personalisation, website usage affects customer retention.</td>
<td>End user</td>
<td>No major theory discussed.</td>
</tr>
</tbody>
</table>

Table continued /…
## IS Success Studies: e-Commerce Focus

<table>
<thead>
<tr>
<th>Source</th>
<th>Main findings</th>
<th>Stakeholder Elicitation</th>
<th>Theoretical foundation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kim et al. (2002)</td>
<td>Six dimensions of architectural metrics relating to the website are proposed: internal stability, external security, information gathering, order processing, system interface, and communication interface.</td>
<td>End User, Systems Quality (website)</td>
<td>Based on theory in the Architecture literature</td>
</tr>
<tr>
<td>Zhu &amp; Kraemer (2002)</td>
<td>In a study of net-enhanced organisations in the manufacturing sector, four e-business capability metrics were derived: information, transaction, customisation, and supplier connection. Significant relationships between these metrics were found with that of firm performance.</td>
<td>Organisational view of IS Success, Multi-dimensional IS Success categories</td>
<td>Resourced-based theory.</td>
</tr>
<tr>
<td>Boyd (2002)</td>
<td>Proposes a goals, questions, indicators, measures (GQIM) approach to measure customer satisfaction with e-Commerce websites. This approach, which has ten steps, starts with high-level business goals, and breaks them into measurable sub-goals. IT continues to identify measures and indicators that address those goals.</td>
<td>End user, &amp; IS Manager, Multi-dimensional categories of IS Success including, user satisfaction, systems quality, net benefits.</td>
<td>No major theory discussed. Model is derived from analysis of prior studies.</td>
</tr>
</tbody>
</table>
## IS Success Studies: e-Commerce Focus

<table>
<thead>
<tr>
<th>Source</th>
<th>Main findings</th>
<th>Stakeholder Dimension</th>
<th>Theoretical foundation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delone &amp; McLean (2004)</td>
<td>A theoretical study that demonstrates that the six dimensions of IS Success in the IS Success Model (Information Quality, System Quality, Service Quality, Use, User satisfaction, and Net Benefits) are applicable in the e-Commerce environment.</td>
<td>End user (customer perspectives). Systems Quality, Organisational benefits</td>
<td>No major theory discussed. IS Success Model used as basis for findings.</td>
</tr>
<tr>
<td>Lee &amp; Kozar (2006)</td>
<td>Website quality (system quality, navigability, security, business reputation, &amp; price savings); correlated website quality positively with firm performance; perceptual gaps exist between customers and managers/designers</td>
<td>End user &amp; e-Commerce managers Systems Quality, Organisational benefits</td>
<td>No major theory discussed. Model is derived from analysis of prior studies.</td>
</tr>
<tr>
<td>Cao et al. (2005)</td>
<td>Presents a framework of Website Quality indices for evaluating website quality. This includes System Quality, Information Quality, Service Quality, and Attractiveness, which jointly affect Perceived Usefulness of the website and Perceived Ease of Use. The latter jointly affect customer's intention to revisit a Website.</td>
<td>End user (customer) Systems Quality, Information Quality, Service Quality, User satisfaction.</td>
<td>Technology Acceptance Model &amp; IS Success Model</td>
</tr>
<tr>
<td>Garrity et. al. (2005)</td>
<td>Examines Web-based Information Systems (WIS) Success, with the focus on User satisfaction. Three success components identified: Task Support Satisfaction, Decision Support Satisfaction, and Interface Satisfaction.</td>
<td>End user (customer) Systems Quality (website)</td>
<td>Technology Acceptance Model &amp; IS Success Model</td>
</tr>
</tbody>
</table>
Close perusal of the studies presented in the tables above, serves to reinforce the notion that the field of IS Success is fragmented both in the pre- and post- e-Commerce eras. Furthermore, the studies in these tables demonstrate that there are a number of different models of success, and a variety of approaches to evaluation.

Table 2.12 below presents an analysis of the studies presented above. The table contrasts the e-Commerce studies with those from the pre- e-Commerce era, according to the IS Success dimension, the evaluation perspective, and the use of theory in the studies.

<table>
<thead>
<tr>
<th>IS Success Dimension:</th>
<th>Pre-e-Commerce</th>
<th>e-Commerce era</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>User satisfaction</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Information Quality</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Organisational Impact</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Service Quality</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Multi-Dimensional</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>System quality</td>
<td>3</td>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Evaluation Perspective</th>
<th>Pre-e-Commerce</th>
<th>e-Commerce era</th>
</tr>
</thead>
<tbody>
<tr>
<td>End user</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Management &amp; end user</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Management</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Use of Theory</th>
<th>Pre-e-Commerce</th>
<th>e-Commerce era</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study based on a substantive theory</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>No substantive theory</td>
<td>6</td>
<td>11</td>
</tr>
</tbody>
</table>

With regard to the IS Success dimension, no one dimension has overwhelmingly dominated the pre- e-Commerce studies. The success dimensions of user satisfaction and systems quality dominate the e-Commerce studies. Both these dimensions, however, relate to the website only, i.e., customer satisfaction with the use of the website and the quality of the website. None of the studies have investigated the
back-end ECIS, which form an integral part of e-Commerce infrastructure.

Whereas the pre-e-Commerce studies in the sample have examined IS Success from the perspective of both management and the end user, the e-Commerce studies were dominated by an end-user focus only. Of the eight studies that had an end-user focus, all of them investigated customers’ perceptions of website success. Only two studies in the sample considered e-Commerce managers’ perspectives of IS Success.

Lastly, the majority of both the e-Commerce and pre-e-Commerce IS Success studies in the sample were not based on any substantive theoretical framework. This is indicative of the absence of strong theoretical frameworks to guide IS Success research.

2.16 Conclusion

The body of literature pertaining to IS Success is an expansive one. The nature of the research questions in this study necessitated a wide coverage of the literature. The broad ambit of the principal research questions influenced the literature review to be as wide as possible. The user-satisfaction and service quality dimensions of success were treated in greater depth than other success dimensions, as a preliminary literature review indicated that these were the most common approaches to IS evaluation. The fact that other dimensions of IS Success were not treated in as much detail as these is not to suggest that they were of less importance in this study. Rather, it demonstrates that these success dimensions are not widely covered in the literature. This imbalance does, in fact, serve to reinforce the research aims, i.e., that this study should approach the field with a more open mind, so as to empirically ground success factors, rather than rely on a fragmented body of literature to provide a theoretical underpinning.
There are several important conclusions that can be made from the study of the literature:

- **Voluminous ECIS Success metrics:** I agree with DeLone & McLean (1992: 88), who posit that there is not one success measure but many, and that there are as many metrics as there are studies. This is true with regard to both IS Success studies in general as well as the e-Commerce literature. With such a diversity of options, researchers are confronted with great difficulty in choosing appropriate success metrics to apply in the field. Consequently, the research problem identified in Chapter One cannot be sufficiently addressed on the basis of the existing body of knowledge.

- **Paucity of ECIS Success studies in the broader e-Commerce literature:** An assessment of the e-Commerce literature in general indicates a paucity of studies into ECIS Success. This is substantiated by Wareham et al. (2005), who profiled e-Commerce research in the period 1997 to 2003. In an in-depth analysis of 582 articles from both practitioner and professional journals, they found that 5% of research articles dealt with the “value of IS”, which they describe as “analytical exercises that attempt to determine the economic value realized in electronic commerce applications” (Wareham et al., 2005:3). They also describe this domain of research as being “primarily concerned with the measurement of the financial return on investments in e-Commerce applications…” (Wareham et al., 2005:9). This is indicative that the research in this field has focused mainly on financial indicators of IS value. This is just one approach to evaluating ECIS Success. Without a coherent framework to understand IS Success more broadly, financial evaluation exercises may not yield proper results. The study by Wareham et al., in particular, supports my own assessment of the literature, i.e., that the issues identified in the research problem regarding ECIS Success, have not been sufficiently addressed in the extant body of knowledge.
- **e-Commerce rests on a platform of IS Success.** E-Commerce businesses rely on successful ECIS, to remain operational twenty-four hours a day, seven days a week. IS Success concerns are greatly elevated in the e-Commerce business environment as compared with brick and mortar businesses. Indications of failure cannot be attributed to poorly designed websites only. However, what is not clear in the literature is exactly how other elements of ECIS have contributed to failure. The literature does not sufficiently address issues related to the success of back-end IS, and how these systems should be managed.

- **Narrow end-user (customer) and web-interface focus:** Only a few of the studies that were reviewed provide business managers with a sufficient breadth of understanding to enable them to grasp all of the issues relevant to the dynamics of IS Success. The application of almost all studies identified in the literature, only arms managers with knowledge of customers’ expectations. Additionally, most of the studies consulted were focused mainly on website design and strategies to evaluate the success of the website. This narrow focus does not address the research problem in this study. Managers need to better understand how to successfully manage ECIS from within the organisation so as to meet customers’ expectations. The current body of literature has produced an abundance of knowledge regarding customer satisfaction and website quality, with scant regard to the internal management of ECIS. This demonstrates that the research questions identified in this study are relevant and warrant an empirical enquiry.

- **Not many theories:** In Section 2.14, I presented an overview of some of the theories used by researchers to underpin their studies. In Section 2.15, I demonstrated that there were few theories cited in the literature. It is my view that as a consequence of the fragmentation of
the IS evaluation field of research, there are no consistent trends in
the application of theories. In addition, an assortment of theories is
used. This leads me to conclude that the development of an IS
Success theory, which is one of the main aims of this study, is a
worthy one that will be of value to the academic community.

Finally, from the foregoing conclusions, and the work undertaken in this
chapter, it is clear that the research questions raised in Chapter One
remain a challenge and that the aims of this study are of importance to
the IS academic community. This conclusion provides an appropriate
foundation on which to develop an appropriate research design for this
study. This is outlined in the next chapter.
CHAPTER THREE

PHILOSOPHICAL FOUNDATION AND RESEARCH DESIGN

The philosophers have only interpreted the world, in various ways; the point is to change it
(Karl Marx, 1845)

Overview
This chapter explains the journey that I have undertaken, which started with a rudimentary understanding of research methods and developed into a much broader and deeper perspective that was required for doctoral research. Thereafter a framework is presented to show the relationships between the salient elements of the research design, viz., research philosophy, research approaches and techniques, and the everyday world in which the research problem was identified, articulated and operationalised. In the light of the ongoing debate concerning IS as a discipline, the chapter then considers the nature of IS academic research. This is followed by a discussion that compares and contrasts various philosophical underpinnings of Social Science research that were identified in the IS literature. A motivation is then presented as to why the critical realist paradigm is an appropriate intellectual underpinning for this study. The two main methodological paradigms of quantitative and qualitative research are subsequently contrasted. Thereafter, I present a framework for the development of theory. This is followed by a discussion of how the canons of positivist research should be adapted for qualitative research evaluation. Finally, a summary of the salient aspects of the research design is presented.

Introduction/…
3.1 Introduction

Epistemology\textsuperscript{1} derives from \textit{episteme}, the Greek word for “knowledge”. Henning (2004) avers that epistemology is the philosophy of knowledge or “\textit{how we come to know}”. A scientific inquiry involves the pursuit of knowledge in which we seek as close an approximation of the truth as possible (Babbie & Mouton, 2001). The epistemological positions of researchers are influenced by their ontological stance which, literally translated from its Greek derivative, means “\textit{the study of being}”. Epistemology and research methodology are intimately related. The former involves the \textit{philosophy} of how we come to know the world, and the latter involves the \textit{practice} of coming to know and how we study this practice (Henning, 2004:15). The discussion of philosophy that follows in Section 3.4 is important, as it is an essential component of a research degree especially at doctoral level (Harré, 1985).

In this chapter, I reflect on the epistemological influences on this research, and the methodological paradigms associated with these. I also describe the research design,\textsuperscript{2} and justify the rationale behind the approaches that have been pursued in this research. The discussion of the research design in this chapter also represents an important component of the learning curve that took place during the initial investigation. When I initially undertook this doctoral study, the scope of my scientific thinking was narrow in that it was limited to the research exposure during my Master’s degree. After initial readings on scientific

\textsuperscript{1} Epistemology, or theory of knowledge, is the branch of philosophy that studies the nature and scope of knowledge. The term “epistemology” is based on the Greek words \textit{episteme} (knowledge) and \textit{logos} (account/explanation); it is thought to have been coined by the Scottish philosopher James Frederick Ferrier.

\textsuperscript{2} Following on Babbie & Mouton (2001:74-75), I distinguish between the “research design” and the “research methodology”. The research design focuses on the outputs of the study, i.e., what type of study was envisaged during the planning of this research, and the kind of results that were expected. The point of departure is the research problem at hand and the focus is on the logic of the research, i.e., the nature of evidence that is required to address the research question. The research methods are discussed in Chapter Four.
practice as well as after a number of discourses with experienced researchers, I came to the conclusion that it was important for me to firstly gain an understanding of the various schools of scientific thought. This would be an important foundation upon which I would be able to make informed decisions regarding a research design that would be suitable to achieve the research aims and objectives that were outlined in Chapter One.

3.2 The research design in context: the Three World Framework

The purpose of academic research is to add something of value to the body of established knowledge. According to Mouton (1996) there are “three worlds” of knowledge, viz., the world of everyday life, i.e., lay peoples’ knowledge, the world of science and scientific knowledge, and the world of meta-science. The pursuit of scientific research is fundamentally an interaction between these three worlds.

Figure 3.1 presents the basic tenets of these three worlds, and following on Mouton (1996:7-10; 2001:138-139) we can distinguish among them as follows:

- In World One, we require knowledge to enable us to live our day-to-day lives. This world consists of objects or entities such as individual human beings, collectives, and organisations that use knowledge such as common sense, practical skills, experience, etc., to solve technical problems, make decisions, and thus cope more effectively with everyday life. It is the pragmatic interest in day-to-day living that drives individuals to acquire knowledge in World One.

3 Mouton (1996:11) describes the world of metascience as consisting of “the meta-reflective disciplines (philosophy and sociology of science) that make the world of science into an object of critical inquiry and reflection”.

4 Note that the distinction between these three worlds is for analytical purposes only, and as such, does not imply that these worlds exist separately in everyday life.
In *World Two*, researchers view the phenomena of World One as objects of systematic and rigorous inquiry. This world consists of various scientific disciplines (e.g., social science, humanities, natural science), a body of scientific knowledge (theories, models, explanations, paradigms), and a number of methods with which to practise science. The search for the truth, or the epistemic interest, is the overriding goal in World Two. Just as the pragmatic interest promotes the acquisition of knowledge in World One, the epistemic interest permeates the whole process of knowledge production in World Two.

In *World Three*, researchers have to constantly submit their research decisions to critical reflection, e.g., making choices as to which theories to select, how to measure phenomena, which research design to choose, etc. Over the years, this practice has led to the development of various meta-disciplines such as the philosophy and methodology of science, research ethics, and the sociology of science.

*Figure 3.1/...*
In the context of this study, the analogy of the three worlds can be explained thus: the worlds of business and e-Commerce, which are part of our everyday lives, is a subset of World One. The research problem relates to a need in World One. The solution of this problem, requires the researcher to interact with World Two, the world of science, in order to review existing theories, concepts and explanations about the phenomena associated with the research problem, viz., ECIS success. This was done in Chapter Two, in which I concluded that there were not sufficient theories and explanations to solve the problem. Thus the next
step was to engage with the tools and techniques of World Two and to make an informed choice regarding their use. However, in making these choices, and in deciding how to apply these research tools, I had to firstly reflect on the various scientific options in World Two. This implied that I had to take cognisance of the various paradigms in the philosophies of science and how these philosophies would influence my engagement with World Two, i.e., I had to become conversant with the world of meta-science, World Three. Accordingly, in the next four sections (3.3 to 3.6) I will

(i) review the well-known paradigms of scientific philosophy appropriate to IS research;
(ii) locate this research undertaking within an appropriate philosophical context; and
(iii) discuss whether either qualitative or quantitative oriented research methods would best serve the objectives of this study.

3.3 Background to philosophical orientation in the IS discipline

A considerable amount of IS research is conducted using the positivistic research tradition (Orlikowski & Baroudi, 1991; Alavi & Carlson, 1992; Roode, 2003). There are perhaps two reasons for this. The first is that IS grew out of the more technical subject of computer science (Baskerville & Myers, 2002) with many IS academics using concepts like systems theory as a basis for the analysis and understanding of business systems (Falconer & Mackay, 2000). Secondly, academics have come to IS from technical backgrounds including engineering, physical sciences and mathematics. But IS has been changing radically and it now encompasses a much broader series of issues, addresses a much wider range of questions, and uses a much more eclectic range of methodological stances and tools (Benbasat & Zmud, 2003). This has happened as technology has become increasingly powerful and stable
and organisations have found applications of IS in every conceivable business, organisational and management domain. This has resulted in IS conceptualisation and research being quite opportunistic in terms of what it uses as reference disciplines. If there is any guideline as to what reference disciplines are relevant to IS, it is that IS practitioners, consultants or researchers apply useful ideas emanating from other disciplines irrespective of their source of origin. This catholic approach to ideas has proved quite successful. However, eclecticism has its price and it is not surprising that the IS community of researchers has over the years presented a variety of research methodological arguments as to why varying philosophical stances are appropriate for their research. Papers by Boland (1985), Walsham (1995), Remenyi et al. (1997), Dobson (2002), and Klein (2004) are examples of such contributions to the debate on appropriate philosophical underpinnings for IS research. Additionally, there have been much debate and introspection into the nature of the IS discipline in respect of whether or not it constitutes a science in its own right (Khazanchi & Munkvold, 2000; Wyssusek et al., 2002; Benbasat & Zmud, 2003; DeSanctis, 2003). If Einstein’s view of science is accepted, then the work conducted by many academics in the IS field constitutes science. But this debate is not likely to dissipate simply on the authority of a physicist, even one of Einstein’s standing, and thus it is clear that IS research is certainly a fertile ground for the practice of reflection.

It is now well established that the study of IS is informed on both theory and practice levels by a wide variety of subjects ranging from marketing, consumer behaviour, finance, investment appraisal, project management, corporate strategy, human resource theory (Banville & Landry, 1989; Baskerville & Myers, 2002). Figure 3.2 presents a

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5 According to Einstein (1950), “Science is the attempt to make the chaotic diversity of our sense-experience correspond to a logically uniform system of thought. In this system single experiences should be correlated with the theoretical structure in such a way that the resulting co-ordination is unique and convincing.”
classification of fields of study that have been associated with IS research.

![Classification of IS Reference Disciplines](image-url)

**Figure 3.2: A classification of IS reference disciplines with underlined areas indicating Social Science disciplines**  
(Adapted from: Khazanchi & Munkvold, 2000:35)

Furthermore IS research frequently draws on and combines different aspects of these disciplines (Ridley & Keen, 1998). Thus the term multi-disciplinary (Laudon & Laudon, 2000) or trans-disciplinary,\(^6\) has become common in this field of study. These business and management topics are deeply rooted in social science (see Figure 3.2) and the range of academic research traditions in this field of study is substantial. It is now clear that IS researchers increasingly need to reassess their research options or possible approaches to take advantage of current methodological thinking.

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\(^6\) It is now being suggested that the term trans-disciplinary is more appropriate than multi-disciplinary in the field of business and management studies. Establishing a clear definition of the terms multi-disciplinary or trans-disciplinary, which will highlight the exact differences between these concepts, constitutes a separate study and will not be addressed in this thesis.
The issue of methodological choice has been brought to the IS research agenda by various authors (Falconer & Mackay, 2000; Mingers, 2001; Roode, 2003). Some authors such as Roode (2003) have criticised IS researchers for being too positivistic in their leanings. Others have advanced strong cases for the adoption of alternative non-positivist approaches to IS research, e.g., Interpretivism (Walsham, 1995) and Critical Realism (Dobson, 2002, Mingers, 2002).

3.3.1 The nature of the field of Information Systems research

Before exploring the methodological and philosophical options, it is useful to discuss the context of the field in which IS researchers work. We have not been studying IS for as long as other disciplines such as economics and sociology, since computers were first applied in business around 1952 only. At that stage computers were seen as a technical issue and it was only in the late 1960s that research into their application in organisations began. Thus compared to other academic endeavours, IS as a field of study can be considered as a “new kid on the block” (Hirschheim & Klein, 2003:282). As such its academic legitimacy has been challenged by the question: “Should IS be regarded as an academic discipline in its own right?” In answering this question it is necessary to address the definition of the term “discipline”.7 In academic circles it implies boundaries and also suggests enforcement and perhaps punishment. This is rather problematic in an age when the idea of boundaries is on the wane and as a result IS researchers often prefer to talk about their subject as being a field of study rather than a discipline. The notion of a field of study is broader than that of a discipline and it does not require any specific academic consensus to legitimise work done in that field. When viewed in this way, the question does not

7 There are different meanings of discipline. It means: (i) control or order exercised over people or animals, esp. children, prisoners, military personnel, church members, etc.; (ii) the system of rules used to maintain this control; (iii) the behaviour of groups subjected to such rules; and (iv) a branch of instruction or learning.
become one of academic legitimacy but rather one of whether the results of the study of IS are actually useful. This approach sees pragmatism (Alvesson & Sköldberg, 2000) as a fundamental requirement for successful research in business and management studies.\(^8\) Of course there is no closure to a debate such as this and the argument continues, involving researchers such as Lucas (1999), Khazanchi and Munkvold (2000), and Hirschheim and Klein (2003). Furthermore, researchers such as Khazanchi and Munkvold (2000) have opened up another dimension to this discussion by focusing on the inter-disciplinary nature of the IS field of study and it has been said that this is one of the sources of the identity crisis in this field. However, at this stage, there is no conclusiveness to this debate. What is clear though, is that there is a sufficient body of rigorous IS research findings, published in academically peer-reviewed journals, to justify a view that IS research is indeed a valuable academic and scientific pursuit.

3.3.2 The study of Information Systems as a Social Science

In response to the question as to whether the IS field is a science, Khazanchi and Munkvold (2000) concluded that IS is indeed a scientific discipline. However, given that the study of IS emanated from disciplines such as Computer Science and Organisational Science (Benbasat & Weber, 1996), it is necessary to resolve the question of what sort of science is being practised in this study. In the contemporary era of IS research, the answer to a question such as “Does information systems belong to the Natural or Social Sciences?” may seem obvious.\(^9\) Moreover, IS research papers regularly use the term “Social Science”. I

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\(^8\) This argument supports the call for more relevant research through Mode Two work as articulated by Gibbons et al. (1994), Tranfield and Starkey (1998), Weick (2001) and others.

\(^9\) There are an increasing number of IS research papers, e.g., Walsham (1995), Carlsson (2003), and Mingers (2002) that refer to social theorists. Furthermore, a number of authors have aligned their IS research with well-known social science paradigms such as Critical Theory (Dobson, 2002) and Hermeneutics (Whittaker, 2004).
concur with the various authors that have provided supporting evidence that the IS field of study needs to be regarded as a social science, e.g., Jones (2000), Dobson (2002), and Mingers (2002).

3.4 Traditional philosophical options

From a scientific perspective, philosophy is primarily concerned with the way in which scientists rigorously establish, regulate and improve the methods of knowledge creation in all fields of intellectual endeavour (Chia, 2002). The first step in understanding the implications of the methodological options in any research undertaking is to review the main features of the principal philosophical schools of thought. Having knowledge of these different options has become an integral part of the study of social science research. IS is essentially a pluralistic field (Galliers, 1992) and thus it is especially relevant for a researcher to be familiar with this debate and to be able to understand and reflect on the differences and similarities between these philosophical choices and to consequently take a position on them.

There were different options that were at my disposal, with each of them comprising a particular nuance and its own vocabulary. A crucial aspect of research is that the choices made by the researcher should be reasonable and that they are made explicit in the research report (Denscombe, 2003). Research in the IS field has been classified according to three well-known philosophical approaches, viz., positivism, interpretivism, and critical theory (Orlikowski & Baroudi, 1991).
3.4.1 Positivism or Logical Positivism

Positivist or logical positivist\(^{10}\) research is based on the notion that research can be objective, that the researcher is independent and that the results are valid, reliable and generalisable. This type of research, which is often directly associated with the scientific method (Galliers, 1992), draws on the notions of reductionism, determinism and falsification.\(^{11}\) In the physical and life sciences, positivism is regarded as being the research paradigm that has delivered the scientific and engineering successes such as the electric motor, the internal combustion engine, manned flight, a heart transplant and a robot on Mars. Positivism has served scientists of the past well, and is still held in high regard by many researchers, whether they be in the physical and life sciences or in the social sciences.

When scholars began to turn their attention to how organisations and the individuals within them functioned, they looked towards the scientific method. This led to a new scientific community that addressed what was then referred to as the social sciences. One of the initiators of this, Auguste Comte (Comte, 1975), is noted for his positivist approach. The main thrusts of Comte’s philosophy are summarised by Babbie and Mouton (2001:22) as follows:

“For Comte the ultimate idea is to establish a society founded on scientific principles. This ideal could only be realized if the social sciences obtain the same control over its domain as is the case in the natural sciences. It is therefore only logical that the best strategy for the social scientist is to follow the same methodology as that of the natural scientist. This means that in both domains the aim is to establish universally valid, causal laws of human behaviour”.

\(^{10}\) Logical Positivism was the term used by Hans Hahn, a member of the Vienna Circle in the 1920s, to describe the notion that the basis of knowledge rests upon public experimental verification rather than upon personal experience. Strict logical positivists hold that any other claim for knowledge is meaningless (Babbie & Mouton, 2001:24).

\(^{11}\) Falsification, which was introduced by Karl Popper, implies that an idea could not be regarded as scientific unless it was falsifiable (Remenyi et al., 1998:33).
Although this approach dominated the early years of social science, by the beginning of the 20\textsuperscript{th} century it became clear that there were other ways of studying organisations and individuals. Max Weber had established an alternative way of researching in the field of social science and with the publication of \textit{The Protestant Ethic} and \textit{The Spirit of Capitalism} in 1904, an alternative to positivistic research was beginning to be formulated (Weber, 1930). At about the same time the Chicago School of Sociology was also pioneering a non-positivistic approach to the study of sociology (Bulmer, 1984). Although this was picked up by a number of social scientists, in general, the positivist approach to research in social science remained dominant well into the second half of the 20\textsuperscript{th} century.

When IS became an active field of study, positivists dominated research in this area (Orlikowski & Baroudi 1991; Wyssusek \textit{et al}., 2002) and, as Roode (2003) points out, in some senses still do. Exponents of positivist traditions utilise mainly quantitative research methods. Roode’s (2003) view of positivism is that

\begin{quote}
“the positivist regards the objects of her study as exactly that viz., objects, and applies the methods and practices of the scientific method in investigating these objects with the aim of reaching valid and truthful conclusions about them, thereby contributing to knowledge that attempts to uncover universal laws to be used for predictive purposes”.
\end{quote}

There are extensive criticisms of positivism such as that expressed by Karl Popper (cited by Sir Peter Medawar) who recalled:

\begin{quote}
“Boswell-like, I once asked Karl Popper to express in a sentence the quintessence of the teaching of positivism. He at once replied: ‘The world is all surface’.”
\end{quote}

(Medawar, 1986).

Although the positivist view is still strongly upheld by many IS researchers, in the current era there is a much wider acceptance of
alternative philosophical views. The critique of the positivist approach
gave rise to other ways of researching and understanding. One such
development was that of Interpretivism.

### 3.4.2 Interpretivist approach

There were two separate centres where interpretivist research
developed in the early part of the 20th century, one in Germany and the other in the United States of America (Koch, 1999). In Germany the influential efforts of Max Weber and German philosophical idealism helped social science establish a human-centred focus, which was not based on positivism. The Chicago School of Sociology was also influential in these developments (Bulmer, 1984), and the main research paradigm was field studies for which anthropology is well known.

This approach to research does not rely on numerical or statistical analysis of data or evidence. Interpretive researchers do not suggest that research can naturally be objective but they argue that through carefully implementing procedures such as triangulation, a large part of the bias inherent in individual researchers can be identified, and at least to some extent controlled.

This approach to research was picked up by others including Alfred Schutz (Pietrykowski, 1996; Dobson, 2001a; Ng, 2002; Vendelo, 2003) who made a major contribution to the many key ideas underpinning interpretivism which were developed during the 1940s. Whereas positivism emphasises the similarities between the objects of the natural and social sciences, the interpretivist tradition recognises the differences between them (Babbie & Mouton, 2001). Interpretivists acknowledge that the problem which they are researching exists in a social context (Jones, 2000), and that the most appropriate way of understanding social actors may not necessarily be through numbers and statistical tests. This view is expounded by Roode (2003), who avers that:
“The interpretivist researcher recognizes that many important problems related to the development, use and implementation of IS intimately concern people, and accepts that the social world presents a better stage to study these phenomena than the purely material world of technology. Moreover, this social world is accepted to be a human construction with many attributes that cannot be quantitatively observed and measured, and the interpretivist deliberately sets out subjectively to understand these constructs, often through active involvement, and never so-called objective, independent observation. Understanding is the main role of the interpretivist, and never prediction.”

Walsham (1995:376) offers the following view of Interpretivism:

“Interpretive methods of research adopt the position that our knowledge of reality is a social construction by human factors. In this view, value-free data cannot be obtained, since the enquirer uses his or her preconceptions in order to guide the process of enquiry, and furthermore the researcher interacts with the human subjects of the enquiry, changing the perceptions of both parties. Interpretivism contrasts with positivism, where it is assumed that the ‘objective’ data collected by the researcher can be used to test prior hypotheses or theories.”

The growing interest in interpretivism among the IS research community (Markus, 1997; Myers, 1997; Khazanchi & Munkvold, 2000; Klein & Myers, 2001; Bannister, 2005) attempts to address complex issues related to the interaction between IS and management, organisation and individual behaviour. This interest may be attributed to the acceptance that IS research is essentially conducted within a social domain, e.g., organisations, users, managers, communities, governments, etc.

Interpretivism can be critiqued on many levels, e.g., although proponents argue strongly that bias should be eliminated from the research process, the reality is that this is not possible. The advent of Interpretivism has led

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12 The use of the word “never” is interesting, coming as it does from an interpretivist.
to a number of debates with positivists, e.g., Walsham (1995), regarding the usefulness of the one or the other approach in IS research.

3.4.3 Critical Theory

Different to both positivism and interpretivism is another approach referred to as Critical Research. Critical social science can trace its origins back to the work the Frankfurt School, which was established in 1923 by Felix Weil (Wiggershaus, 1994). One of the aims of this school of philosophy and sociology was to overcome the limitations of positivism and interpretivism. Today the most distinguished representative of the critical school is Jürgen Habermas. Critical researchers often conduct their research in the context of Marxism, feminism, corporate power structures, anti-racism and anti-colonialism. This approach to research denies that a researcher can be objective. According to critical researchers, bias is inherent in the human condition. Therefore researchers come to their work declaring their interests, biases, and purpose or use of their research. Babbie and Mouton (2001:34) point out that the single most distinctive feature of the critical research tradition is its insistence on science, and therefore knowledge, becoming an emancipatory and transformative force in society. They further argue that critical social scientists recognise the contribution of both positivism and interpretivism, i.e., they accept the need for both causal theories based on objective observation as well as interpretive descriptions based on inter-subjective understanding.

Critical research methods are gaining a foothold among IS researchers, among whom there is a growing following for this approach (Dobson, 2001b; Mir & Watson, 2001; Carlsson, 2003; Mingers, 2003; Pozzebon 2003). This school of thought draws attention to the fact that IS are seldom, if ever, neutral in their effect on corporate power structures and on individual work patterns, remuneration and control. In fact since the early 1990s, through the ideas of Hammer and Champy (1993) and
Davenport (1997), some IS researchers have specifically designated themselves as agents and facilitators of change. Such issues are well suited to the critical research approach.

3.5 Critical Realism

The foregoing discussion outlined the principal tenets of three of the more common methodological paradigms in IS research. Each of these research approaches has highly articulate critics as well as champions. In the past few years it has become increasingly obvious that no one of these positions has more privileged access to understanding than another. Often an effective way of conducting research requires a combination of approaches. This assertion is a philosophical stance in its own right and has been referred to by some as critical realism. The critical realist approach was pioneered by Roy Bhaskar (Bhaskar, 1975). For its intellectual underpinning, critical realism draws on concepts and tools from positivism, interpretivism and critical theory to assist the researcher (Mingers, 2002; Carlsson, 2003; Klein, 2004).

Carlsson (2003) observes that critical realism has provided an important perspective in both modern philosophy and social science. He points out that it continues to grow as an important approach in IS research. Further analysis of research reports indicates that realists seek connections among phenomena rather than formal associations or regularities (Sayer, 2000). In general, a critical realist’s understanding of science takes the view that certain types of entities (be they objects, forces, social structures, or ideas) exist in the world, largely independent of human perception, and that through research we can gain reliable knowledge of them (Mingers, 2002).

13 Business process re-engineering which has been proposed by Hammer and Champy (1993) and followed up by Davenport (1997) could be seen in some sense as a type of action research driven by an agenda to downsize organisations. In this light it could be perceived as having a link to Critical Theory thinking.
According to Schostak (2002), a distinction is clearly made by critical realists between the world of nature and the world of society. The former is amenable to a variety of forms of experimental and statistical analysis and the latter is not. Schostak (2002) goes on to provide the following reasons for this assertion: (i) the social researcher is part of the world being studied, hence the act of researching affects what is being researched and its results change the social world (see also Ghoshal, 2005); (ii) the world of the social researcher is composed of agents who are continually constructing and de-constructing their world and their acts within the world. In short, the social world cannot be as highly controlled as the objects defined by the natural sciences.

Sayer (2000:10-12), in referring to Bhaskar’s views of realism, provides a deeper explanation of Schostak’s notions of the world of nature and the social world by making the distinction between the transitive and intransitive dimensions of knowledge as follows: the objects of science (physical processes or social phenomena) form the intransitive dimension of science; whereas the theories and discourse as media and resources of science are part of the transitive dimension. Various theories and the sciences from which they are derived have different transitive objects, but the world they are about (the intransitive dimension) remains the same. When transitive dimensions change, intransitive dimensions do not necessarily modify. The latter is true for the natural world. However, the social world cannot be said to exist independently of our knowledge of it. Social scientists, therefore, are cast in the role of construing rather than constructing the social world. Thus, as researchers, our views of the world should not be conflated by our experiences of it. Consequently, Sayer recommends that critical realism should not be confused with empirical realism, which connects the real with the empirical.
Mingers (2002:298-300) describes the following key characteristics of critical realism:

- Critical Realism does not have a commitment to a single form of research; rather it involves particular attitudes towards its purpose and practice. First, the critical realist is never content just with description, whether it be qualitative or quantitative. No matter how complex a statistical analysis or rich an ethnographic interpretation, this is only the first step. Critical realism wants to get beneath the surface to understand and explain why things are as they are, to hypothesise the structures and mechanisms that shape observable events.

- Critical Realism recognises the existence of a variety of objects of knowledge (material, conceptual, social, and psychological), each of which requires different research methods to come to an understanding of them, and critical realism emphasises the holistic interaction of these different objects. Thus it is expected that understanding in any particular situation will require a variety of research methods, both extensive and intensive. Critical Realism recognises the inevitable fallibility of observation, especially in the social world, and therefore requires researchers to be particularly aware of the assumptions and limitations of their research.

Additionally, the following key features of Critical Realism have been summarised from Sayer (2000:10-18):

- **Causation:** One of the most distinct features of realism is its analysis of causation. Causation is *not* understood on a model of regular succession of events, and hence explanation does not depend on finding these events, or searching for social laws that are generally acceptable. What causes something to happen has nothing to do with the number of times we have observed it occurring. Explanation depends instead on identifying causal

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mechanisms and how they work, and discovering how they are activated and the conditions under which they operate.\(^{15}\)

- **Hermeneutic dimension:** Critical realism acknowledges that social phenomena are intrinsically meaningful, and hence that meaning is not only externally descriptive of them but constitutive of them. Meaning has to be understood, it cannot be measured or counted; hence there is always a hermeneutic element in social science. While natural scientists have to enter the hermeneutic circle of their scientific community, social scientists also have to enter that of those whom they study, i.e., social science operates in a double hermeneutic circle. These circles imply a two-way movement, a “fusing of horizons” of listener and speaker, researcher and researched.

### 3.5.1 The hermeneutic dimension of Critical Realism

Since hermeneutics could be considered as an intellectual stance in its own right, Myers (1997) is of the view that hermeneutics can be treated both as an underlying philosophy and as a specific mode of analysis. As a mode of analysis, it suggests a way of understanding textual data. The interpretation of texts is thus the point of departure (Alvesson & Sköldberg, 2000). If hermeneutic analysis is used in an IS study, the object of the interpretive effort becomes one of attempting to make sense of the organisation as a text-analogue (Myers, 1997). In an organisation different stakeholders can have confused, incomplete, cloudy and contradictory views on many issues. Myers goes on to explain that the aim of hermeneutic analysis becomes one of trying to

\(^{15}\) Of course there are those who claim that one can never prove the causal link. It is convincingly argued in *Galileo's Mistake* (Rowland, 2001) that we cannot even be certain of what is driving cause and effect. In studying causal links, observation of before and after situations is necessary, but not always sufficient. For example, it is possible that Newton may have in fact observed an apple falling onto his head, but this in itself could not have been sufficient for him to have postulated the Universal Law of Gravitation. As a Realist, I regard the empirical evidence related to the before and after as a sufficient indication of the casual relationship.
make sense of the whole, and the relationship between people, the organisation, and information technology (Myers, 1997).

Hermeneutics points out that the meaning of a part can only be understood if it is related to the whole and vice versa (Alvesson & Sköldberg, 2000). The researcher is therefore confronted with the hermeneutic circle (Klein & Myers, 1999). According to Whittaker (2004), the fundamental motivation for theoretical interpretive research is necessarily also the fundamental principle of hermeneutics, i.e., that of the hermeneutic circle in terms of which the whole receives its definition from the parts, and reciprocally the parts which can only be understood in reference to the whole. She goes on to argue that hermeneutic understanding thus operates in a circular fashion, as interplay between part and whole, in which the understanding of the part is shaped by the whole, while the whole is again shaped by the understanding of the parts. The hermeneutic circle is thus the means of operation in the process of understanding. The application of the principle of the hermeneutic circle is illustrated by Klein and Myers (1999:71):

“...the parts can be the interpretive researchers’ and the participants’ preliminary understandings in the study. The whole consists of the shared meanings that emerge from the shared interactions between them”.

Alvesson and Sköldberg (2000:52-58) distinguish between objectivist and alethic hermeneutics as follows. One of the common traits between these two traditions is their emphasis on the importance of intuition. This implies that knowledge is not to be acquired in the usual, reasoning and rational way. There is instead something of a privileged royal road to true knowledge of the world. This is achieved, not by laborious pondering, but rather at a stroke, whereby patterns in complex wholes are illuminated by a kind of mental flashlight giving an immediate and
complete overview.\textsuperscript{16} Knowledge is then often experienced as self-evident. Intuition implies a kind of inner gazing, separate from the more formal and routine kind of knowledge. There are two types of intuition. The first, which is associated with objectivist hermeneutics, is the traditional \textit{Verstehen}\textsuperscript{17} philosophy, with its emphasis on the re-enactment of the meanings that the originators of texts and acts associate with these. It results in the understanding of underlying meaning, not the explanation of causal connection. The second is alethic hermeneutics, with its focus on truth as an act of disclosure, in which the polarity between subject and object, as well as that between understanding and explanation, is dissolved in the radical light of a more original unity. The alethic approach concerns the revelation of something hidden, rather than the correspondence between subjective thinking and objective reality.

3.5.2 Implications of Critical Realism for this research study

Having considered the foregoing discussion on Positivism, Interpretivism, and Critical Realism, and in weighing these against the research problems and questions, I am able to conclude that the critical realist paradigm is best suited as an intellectual underpinning for this study. The reasons for this are:

- Firstly, critical realism offers a way of bridging the gap which sometimes appears between researchers advocating positivistic and interpretivist research paradigms, and this is especially valuable in IS

\textsuperscript{16} This does not imply that knowledge is instantaneously created without any understanding or context. Rather this suggests that the \textit{immediate and complete overview} is sometimes arrived at \textit{at a stroke}. For example, it would be naïve to assume that Newton's law of gravity was formulated only on the basis of an apple falling on his head or that Archimedes' Principle was not previously percolating in his mind before he took his legendary bath.

\textsuperscript{17} \textit{Verstehen}, a word coined by Max Weber, means subjective understanding or interpretation.
research where both these groups are strongly represented and quite articulate in their arguments. Adopting a critical realist stance therefore allows me the flexibility to approach the research problem concerning ECIS success with a more open mind.

- Secondly, the notion of the transitive and intransitive dimensions of knowledge is important. As an IS researcher I should be aware of the relationship between the objects of IS studies, viz., data, information, stakeholders, hardware, software, etc., and the theories that are applied in the study of these. Taking a critical realist approach to this study would therefore imply that as the researcher I should be cognisant of the fact that I am construing rather than constructing (refer to Sayer, 2000:11) a theory regarding ECIS success. This entails that I need to be mindful of the intransitive dimensions of the study. In particular, I would have to be mindful that the views of the informants are not independent of existing knowledge and thus cannot be assumed to be unbiased or neutral.

- Thirdly, IS researchers need not be married to any particular approach to research. The critical realist utilises both quantitative and qualitative techniques, but at the same time strives to go beyond analyses, and in so doing offers deeper explanations or understanding as to why the objects of our study appear as they are. As Mingers (2000) points out, critical realism wants to get beneath the surface to understand and explain why things are as they are, and to explicate the structures and mechanisms that shape observable events. Such an approach is well suited to this study since the problems concerning ECIS success, as indicated by the literature review, are indeed complicated. A critical realist approach would therefore be supportive of using a combination of research techniques to delve beneath the surface of the empirical evidence, and obtain rich answers to the questions around ECIS success.
Fourthly, critical realism facilitates the acknowledgement of the multidisciplinary and the socio-technical dimensions of IS. This fits in well with the notion that the Critical Realist is aware of the existence of a variety of objects of knowledge. This acknowledgement of a multidisciplinary view to this study is especially important, since current debates concerning IS success increasingly point to the relevance of other disciplines such as marketing (e.g., Watson et al., 1998; Jiang et al., 2002).

In the fifth place, the researcher is expected to approach the observation of the objects of his study, either directly or indirectly, with caution. This implies that I would need to be wary of the fallibility of being an observer in the social setting, and in so doing keep in mind the differences between transitive and intransitive notions of knowledge.

In the sixth place, although causation is an important issue in identifying dimensions of IS success, this study was not initiated by identifying possible dependent and independent success variables as would be the case in most positivist studies. It was not my intention to set out a series of hypotheses seeking to either prove or disprove them by gathering statistical data on regularities and repeated occurrences. Rather, in adopting the view of Sayer (2000:14), my approach would entail the development of explanations regarding the objects which possess the power to influence the success of ECIS.

3.6 Qualitative research

The next hurdle is to choose appropriate strategies with which to conduct the research, i.e., the research methods. The nature of the research problem, and the associated research questions, will
essentially drive the choice of methods. The imperatives of the critical realist tradition suggest that qualitative research methods would be a more suitable approach to select for this study. While more specific details regarding the research techniques and the analysis of the evidence are provided in Chapter Four, this section provides a raison d'ê'tre for the choice of qualitative-oriented tools for the research.

3.6.1 Qualitative versus quantitative design

Snape and Spencer (2003:2-3) describe qualitative research as follows:

“Qualitative research is a situated activity that locates the observer in the world. It consists of a set of interpretive, material practices that makes the world visible. These practices turn the world into a series of representations including fieldnotes, interviews, photographs, recordings, and memos to the self. At this level, qualitative research involves an interpretive, naturalistic approach to the world. This means that qualitative researchers study things in their natural settings, attempting to make sense of, to interpret, phenomena in terms of the meanings people bring to them”.

Quantitative research, on the other hand, is concerned with the collection and analysis of data in numeric form. This form of research tends to emphasise large data sets (Blaxter et al., 2001). The quantitative researcher believes that the best way of measuring the properties of phenomena is through quantitative measurement, i.e., assigning numbers to perceived qualities of entities. The use of variables is critical in describing social phenomena (Henning, 2004), with a central role being the handling of potential sources of error either through experimental or statistical control (Babbie & Mouton, 2001).

Strauss and Corbin (1998) sum up the difference between these two paradigms by suggesting that the term qualitative research implies any type of research that produces findings not arrived at by statistical procedures or other means of quantification.
3.6.2 Justifying the choice of a qualitatively aligned design

Quoting directly from Kant, Snape and Spencer (2003:6-7) posit that the early ideas now associated with qualitative research can be linked to the writings of Immanuel Kant who proposed that:

“Perception relates not only to senses but to human interpretations of what our senses tell us; our knowledge of the world is based on understanding which arises from thinking about what happens to us, not just simply from having had particular experiences; knowing and knowledge transcend basic empirical enquiry; distinctions exist between scientific reason (based strictly on causal determinism) and practical reason (based on moral freedom and decision-making which involves less certainty)".

These ideas of Kant strongly support the tenets of critical realism. A consideration of the main features of both quantitative and qualitative research approaches indicates that a qualitative paradigm is more closely aligned with a critical realist stance for the following reasons:

- Qualitative research is often less structured than other kinds of social research in that the researcher initiates a study with a certain degree of openness to the research subject and what may be learned from it (Ragin, 1994).
- Qualitative research involves the use of data, such as interviews, documents, and participant observation data, to understand and explain social phenomena. The use of such data is in keeping with the Critical Realist tradition of being able to offer deep explanations of the objects of the inquiry.
- The amenability of a Critical Realist approach to multidisciplinary studies has been pointed out. Qualitative researchers can be found in many disciplines and fields, using a variety of approaches, methods and techniques. In IS research, there has been a general

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18 Their summary of qualitative research is based on Immanuel Kant’s Critique of Pure Reason which was first published in 1781.
shift away from technical problems towards managerial and organisational issues. Hence there is an increasing interest in the application of qualitative research methods (Myers, 1997).

Moreover, the basic tenets of qualitative research such as those described by Snape and Spencer (2003:3-4) below, further support the appropriateness of such an approach:

- Research aims are directed at providing an in-depth and interpreted understanding of the social world of research participants by learning about their social and material circumstances, their experiences and histories.
- Samples are small in scale and purposively selected on the basis of salient criteria.
- Data collection methods usually involve close contact between the researcher and the research participants. This results in an interactive and developmental relationship, which facilitates the exploration of emergent issues.
- Data is detailed, information-rich and extensive.
- Analysis is open to emergent concepts and ideas, which may produce detailed descriptions, and classifications. This enhances the identification of patterns of association, and the development of typologies and explanations.
- Outputs tend to focus on the interpretation of social meaning through mapping and “re-presenting” the social world of research participants.

Babbie and Mouton (2001:270) provide a list of distinguishing features of the qualitative paradigm. The relevant features of this list are enumerated in Table 3.1, and the appropriate context of this study in respect of each of these is explained.
## Table 3.1: Aligning the qualitative paradigm with key aspects of the study

<table>
<thead>
<tr>
<th>Key feature of qualitative research</th>
<th>Relevance to the proposed study</th>
<th>Importance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Research is conducted in the natural setting of the social actors</td>
<td>It is envisaged that evidence will be collected from amongst e-Commerce business stakeholders. These will be done mainly at the premises of these businesses.</td>
<td>Medium</td>
</tr>
<tr>
<td>2. A focus on process rather than outcome</td>
<td>The main outcome of this study is a theory regarding ECIS success. The process of conducting the research is seen as more important than the outcome, as the theory is being grounded in the evidence. The process is therefore important, so as to ensure that the outcome is valid.</td>
<td>High</td>
</tr>
<tr>
<td>3. The actor's perspective is emphasised</td>
<td>Since no single underlying theory is used to frame the study, the perspective of the research subjects (e-Commerce managers) is emphasised.</td>
<td>High</td>
</tr>
<tr>
<td>4. The primary aim is in-depth descriptions and understanding of actions and events.</td>
<td>With each interaction with the informants, the aim will be to elicit in-depth descriptions which will continually be analysed and refined to extract important aspects of the theory being developed.</td>
<td>High</td>
</tr>
<tr>
<td>5. The main concern is to understand social action in terms of its specific context rather than attempting to generalise to some theoretical population.</td>
<td>In interacting with the informants, my primary aim is to obtain an in-depth understanding of the practice of e-Commerce in the context of the research settings of the selected businesses. While it is envisaged that the evolving theory would be applicable to e-Commerce businesses in South Africa, the aim is not to generalise, but rather to contribute to an improved understanding of ECIS success.</td>
<td>High</td>
</tr>
<tr>
<td>6. The research process is often inductive in its approach, resulting in the generation of new hypotheses and theories.</td>
<td>The proposed study is seen as inductive in that by thickly describing events from the natural setting, and through continuous refinement, the resultant theory emerges.</td>
<td>High</td>
</tr>
<tr>
<td>7. The qualitative researcher is seen as the &quot;main instrument&quot; in the research process.</td>
<td>The choice of methods to collect evidence, viz., interviews, implies that the researcher is the main instrument of the research process.</td>
<td>High</td>
</tr>
</tbody>
</table>
3.7 Strategies for conducting qualitative research

Research methods focus on the research process and the kind of tools and procedures to be used. The focus is on the individual steps in the research process and the most objective unbiased procedures to be employed. In this section an overview is presented as to why certain strategies were employed in this study.

The qualitative researcher has various research design options available to him. Examples of these options are action research, case studies, ethnography, and in-depth surveys. Having chosen an appropriate design, the researcher then has to select the methods that will be employed within the ambit of the chosen design. Examples of methods available to qualitative researchers are interviewing, observation, document analysis (Denscombe, 2003), focus groups and observation (Henning, 2004). All of these methods have been utilised in various IS studies (Galliers, 1992; Myers, 1997).

3.7.1 The in-depth survey & the use of the interview technique

The choice of the design is determined by a number of factors such as the research questions, the costs or budget available to the researchers, the time available, the initial target date for completion, and the skills of the researcher. In the case of this study, the philosophical underpinnings and the nature of the research questions were also factors that influenced the choice of a qualitative design. Having considered a variety of design types in a number of research texts and research papers, the in-depth survey (Remenyi et al., 1998) offered the best means to gather the required evidence, while adhering to the basic

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19 Refer to Remenyi et al. (1998) and Babbie and Mouton (2001) for a more detailed account of each of these design types.

20 Although the term survey is usually associated with quantitative research, these authors, through the conjugation of survey with the term in-depth, have brought it into the fold of qualitative methodology.
tenets espoused by the critical realist tradition. According to these authors, method generally attempts to obtain detailed in-depth evidence from a relatively small number of informants through a series of interviews.

The use of the in-depth survey strongly supported the goals of the qualitative methodological paradigm in that it allowed me to obtain an insider perspective of the e-Commerce businesses that were sampled. In adopting this approach, I was able to make progress in investigating the research problem on the basis of describing and understanding, or *Verstehen*, rather than that of explanation and prediction of human behaviour.

In reflecting on the research questions, as well the in-depth literature review, it was clear that in order to develop a theory, I would need to get a first-hand perspective of the business and the management issues that had a bearing on ECIS success. An “*insider perspective*” (Babbie & Mouton, 2001) would provide a sufficient enough understanding of the research issues to enable me to achieve this goal. Furthermore, this insider perspective was necessary, as I did not identify any suitable theory from the extant literature, to guide the research.

Various options such as implementing a structured questionnaire, using focus groups, and conducting interviews, were considered in respect of getting such an insider perspective. In keeping with the tenets of the realist tradition, I opted to use semi-structured interviews as the primary technique for gathering evidence. Moreover, the interview technique is widely accepted in social research practice as a means of gathering evidence (Pawson & Tilley, 1997; Travers, 2001; Henning, 2004) especially in the qualitative tradition (Myers, 1997). There are also several IS studies at doctoral level that have used the interview technique, e.g., Lubbe (1997), Bannister (2001), Griffiths (2005).
The *semi-structured interview technique* was chosen for this study precisely because of the nature of the research problem. Given the complexity of the questions around what constituted ECIS success, it was difficult to approach the informants with a rigid set of pre-determined questions. To do this meant that the informants might possibly direct their thoughts only to the questions posed by the researcher.

In the semi-structured interview, a structured questionnaire is not used, as is the case in traditional surveys, but rather the informant is allowed to speak more freely on the subject matter of interest to the researcher, with an interview protocol being used to guide the discussion (Denscombe, 2003). Interviewees therefore are able to speak for themselves, rather than respond to a battery of the researcher’s own pre-determined hypothesis-based questions (Babbie & Mouton, 2001). Rubin and Rubin (1995) advise that qualitative interview design is characterised by being flexible, iterative and continuous, rather than prepared in advance and locked in stone. This technique for evidence collection thus served this research well.

In social research, the evidence that is required does not lie around waiting to be gathered like shells on the seashore. Rather, as Klein and Myers (1999:74) maintain, the facts are produced as intrinsic to the social interaction of the researcher with the knowledgeable informants. Kvale (1996:3-5) offers two metaphors for interviewing: the interviewer as a *miner* or as a *traveller*. The first model assumes that the subject possesses specific information and that the interviewer’s job is to extract it. By contrast, in the second model, the interviewer

“…wanders through the landscape and enters through conversations with the people encountered. The traveller explores the many domains of the country, as unknown territory or with maps, roaming freely around the territory…The interviewer wanders along with the local inhabitants, asks questions that lead the subjects to tell their own stories of their lived world”.

(Kvale, 1996:4)
Following on Kvale’s metaphorical description of the interviewer, I adopted the traveller model in the conduct of this research, as it is suitable to the Critical Realist paradigm, especially the hermeneutical dimension, described above.

3.8 A strategy for developing the theory

Having decided on the use of semi-structured interviews to gather evidence, the next research design consideration focuses on the main aim of the study, viz., the development of an ECIS success theory. To this end, in the following two sections, various definitions of theory are discussed, followed by an overview of a theory development strategy.

3.8.1 What is theory?

According to Denscombe (2003:123), there are two kinds of theory that can be developed:

“The first is linked closely to the empirical situation that has been the subject of study. It is a fairly localized kind of theory and is known as substantive theory. The other kind of theory is more conceptual, with more general coverage, and application to circumstances beyond particular settings. This is known as formal theory. Substantive theory, is closely linked to practice, interaction, and specific kinds of settings, whereas when we speak of formal theory, we usually refer to those areas of generality, such as systems theory, agency theory, population ecology, and contingency theory”.

Accordingly, the type of theory being developed for this study may be referred to as substantive theory. There are a number of explanations and definitions of substantive theory in the literature. For example, Strauss and Corbin (1998:22) propose that
“a theory denotes a set of well-developed categories (e.g., themes, concepts) that are systematically inter-related through statements of relationships to form a theoretical framework that explains some relevant social or other phenomenon”.

In supporting their definition of a theory, Strauss and Corbin argue that theoretical frameworks such as feminism, structuralism, or interactionism\(^{21}\) are not theories as such. They are “a stance, and more of a philosophy” rather than “a well-developed and related set of explanatory concepts about how the world works” (Strauss & Corbin, 1998:24). Bannister and co-authors’ definition of a theory is not too dissimilar from that of Strauss and Corbin. They propose that

“a theory is systematically organized descriptive and/or explanatory knowledge applicable in a relatively wide variety of circumstances, using a system of assumptions, accepted principles, and rules of procedure devised to analyze, predict, or otherwise explain the nature or behaviour of a specified set of phenomena. But it is also often simply the best explanation, which is available at that time”.

(Bannister et al., 2006:39)

Hughes (2003), in discussing theory after Dey (1999:1-2), offers some advice regarding how evidence could be collected:

“theory focuses on how individuals interact in relation to the phenomenon under study; it asserts a plausible relation between concepts and sets of concepts; it is derived from data acquired through fieldwork interviews, observations and documents; the resulting theory can be reported in a narrative framework or as a set of propositions”.

These definitions provided an important foundation that guided the strategy for theory development.

\(^{21}\) Sometimes also referred to as grand theories.
3.8.2 A framework for theory development: from narrative to paradigm

There are a number of examples of research both within the IS field (e.g., Orlikowski, 1993; Correia & Wilson, 1997; Whittaker, 2004; Bannister et al., 2006; Remenyi & Money, 2006) and in the general body of literature (e.g., Yin, 1994; Kvale, 1996; Strauss & Corbin, 1998) that offer varied insights into approaches for theory development. Having considered, the elements of the research design, I adopted a strategy proposed by Remenyi et al. (1998:121-125), which is depicted in Figure 3.3.

Figure 3.3: A framework for the development of theory: from the narrative to the theoretical conjecture
(Adapted from Remenyi et al., 1998:123)
These authors maintain that the scientific process involves a transition from narrative-thinking to paradigmatic-thinking. They describe these two ways of thinking as follows:

“Narrative thinking involves the construction of a consistent and convincing description of the processes or subject matter under investigation. Paradigmatic thinking on the other hand involves the constructions of laws, rules or conjectures from which it is hoped deductions can be made that can be tested against the evidence or observations. The construction of the narrative will depend largely on the qualitative information that is made available… It is possible to regard narrative thought and paradigmatic thought as two poles of a continuum along which the ideas are refined from descriptive generalisations to quite specific statements of relationships.”

(Remenyi et al., 1998:121)

They further propound that creativity in research\(^2\) lies primarily in the narrative mode of thinking which dominates the five steps depicted in Figure 3.3, and it is mostly here that new discoveries are made and innovative ideas developed. This approach thus underscores the development of a narrative in the process of theory development. It is possible to regard narrative thought and paradigmatic thought as two poles of a continuum along which ideas are refined from descriptive generalisations to specific statements of relationships. It is therefore suggested that researchers, in working within this continuum, have to be creative and should not limit their thinking by adhering too strictly to any given method. Instead researchers should be open to a high degree of flexibility and creativity in their approach.

\(^2\) The requirement of creativity on the part of the researcher is also supported by other researchers such as Sandelowski (1995), Strauss and Corbin (1998) and Alvesson and Sköldberg (2000).
3.9 Evaluation of qualitative research

The final component of the research design is concerned with the approaches that could be taken in evaluating the outcomes of this study. In evaluating research generally, a number of questions are usually asked, one of which is, “Are the research findings reliable and valid, and can they be generalised?” The answer this question has provoked a great deal of debate within the academic community, especially since qualitative and quantitative researchers have different views on this subject. Many qualitative researchers maintain that the canons by which quantitative studies are judged are quite inappropriate for judging the merit of qualitative studies (Kvale, 1996; Mason, 2002; Lewis & Ritchie, 2003; Henning, 2004). Kvale (1996:229) sums up the position of many qualitative researchers, in a somewhat cynical swipe at the positivist view on this subject:

“In modern social science the concepts of generalisability, reliability and validity have reached the status of a scientific holy trinity. They appear to belong to some abstract realm in a sanctuary of science far removed from the interactions of the everyday world, and to be worshipped with respect by all true believers in science.”

Strauss and Corbin (1998) argue that the usual canons of research have value but require redefinition to fit the realities of qualitative research and the complexities of the social phenomena that researchers seek to understand.⁴³ Qualitative researchers are expected to guard against the dangers derived from adherence to the more positivistic interpretations of these canons.

There is no one best way to demonstrate or evaluate qualitative research (Henning, 2004), and several approaches have been identified

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²³ The usual scientific canons include significance, theory observation compatibility, generalisability, consistency, reproducibility, precision and verification (Strauss & Corbin, 1998:266).
in the literature. Table 3.2 contrasts some of the more frequently used approaches used in the quantitative tradition with those used in qualitative research.

Table 3.2: A comparison of quantitative and qualitative research evaluation strategies

<table>
<thead>
<tr>
<th>Quantitative</th>
<th>Qualitative</th>
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<tbody>
<tr>
<td>Objectivity</td>
<td>Confirmability</td>
</tr>
<tr>
<td>Internal validity</td>
<td>Credibility</td>
</tr>
<tr>
<td>Generalisability or</td>
<td>Transferability</td>
</tr>
<tr>
<td>External validity</td>
<td></td>
</tr>
<tr>
<td>Reliability</td>
<td>Dependability</td>
</tr>
</tbody>
</table>

3.9.1 Confirmability

The term “confirmability”, as opposed to “objectivity”, is used by qualitative researchers to discuss issues such as reliability and validity. Reliability is generally understood to concern the replicability of research and the obtaining of similar findings if another study using the same methods was undertaken (Lewis & Ritchie, 2003). Validity, according to Kvale (1996:238), pertains to “the degree that a method investigates what it is intended to investigate, to the extent to which our observations indeed reflect the phenomena or variables of interest to us”.

The concepts of reliability and validity were developed in the natural sciences (Lewis & Ritchie, 2003). These authors argue that because of this, and the different epistemological basis of qualitative research, there are real concerns about whether the same concepts have any value in determining the quality or sustainability of qualitative findings. Tests or measures of reliability and validity, as used in mathematical or physical sciences, are inappropriate for qualitative investigation and cause confusion when applied. But in their broadest conception, reliability meaning “sustainable”, and validity meaning “well grounded”, will have relevance for qualitative research since they help to define the strength
of the evidence (Lewis & Ritchie, 2003:270). Some sociologists, however, argue that there is no single reality to be captured in the first place, and therefore replication is an artificial goal to pursue. For example, Bannister (2005:13-14) defines two types of reality, viz., external reality (what actually happens in the social world) and internal reality (subjective reality in the minds of social actors). Therefore, in discussing reliability and validity, qualitative researchers are interested in the “confirmability” of findings (Lewis & Ritchie, 2003:270-271). Confirmability of qualitative research can be assessed through examining credibility, transferability, and dependability.

3.9.2 Transferability

Lewis and Ritchie (2003:265) posit that inferential generalisation, or transferability, is more appropriate to the qualitative paradigm than “generalisability”. Transferability, according to Babbie and Mouton (2001:277), refers to the extent to which the research findings can be applied in other contexts or with other respondents. They propose the following strategies for transferability:

- **Thick description:** The researcher collects sufficiently detailed descriptions of evidence in context, and reports them, with sufficient detail and precision, to allow judgements about transferability to be made by the reader. This judgement, according to Lewis and Ritchie (2003:268), “remains as a hypothesis until proved or disproved by further evidence”.

- **Purposive selection of informants:** In contrast to random sampling, which is frequently used in quantitative studies, qualitative research seeks to maximise the range of specific information that can be obtained from and about the research context, by purposively selecting locations and informants that may differ from one another or be similar to one another.
3.9.3 Credibility

According to Babbbie and Mouton (2001:277), credibility refers to “the compatibility between the constructed realities that exist in the minds of the respondents and those that are attributed to them”. There are numerous strategies that facilitate the credibility of qualitative research, of which the most well known is that of triangulation.

Triangulation is a term that was first used in connection with the validity of measurements derived from structured quantitative data (Ritchie, 2003). On the other hand, in qualitative research, triangulation involves the use of different methods and sources to check the integrity of, or extend inferences drawn, from the data. It has been widely adopted and developed as a concept by qualitative researchers as a means of investigating the “convergence” of both data and the conclusions derived from them (Denzin, 1994). The value of triangulation lies in extending understanding, or adding breadth and depth to our analysis, through the use of multiple perspectives (Ritchie, 2003:43-44). Ritchie thus concludes that the security that triangulation provides is through giving a fuller picture of phenomena, not necessarily a more certain one.

The term “triangulation” is considered problematic by some authors. Henning (2004:103), for example, argues that the term “triangulation” ought to be used with caution as

“it has limitations as a metaphor and does not fit the qualitative methodology, which has more to do with ‘interpreting and sourcing in various ways’ to build a complete picture or text, than with calculating a position from three vantage points”.

Alvesson and Sköldberg (2000:46-47) point out that although the intention of triangulating is to “home in” on the phenomenon to be studied, in practice this may not be possible since
“different methods capture different kinds of aspects [of a study] making it difficult on the basis of their combination, to reach a coherent result, and therefore in reality, methodological triangulation could result in ‘homing out’ on the phenomenon being studied”.

Given the foregoing, qualitative researchers ought to be guarded as to how they use “triangulation”. Moreover, they should be aware that it has originated from the positivist school of thought.

In addition to triangulation, Babbie and Mouton (2001:277) suggest that the following strategies will enhance the credibility of qualitative research:

- **Referential adequacy**: This relates to being able to prove the existence of the evidence that has been collected. Audio or video recordings could be used in this regard.
- **Member checks**: This involves going back to the informants to verify the researcher’s interpretation of the evidence. Henning (2004:149)\textsuperscript{24} refers to this as “dialoguing the knowledge”, and suggests that the researchers could also use platforms such as symposia, conferences, colloquia etc., to enhance credibility.

### 3.9.4 Dependability

The positivist construct of reliability, which assumes unchanging conditions that enable replication of the study, does not hold for non-positivist research (Remenyi et al., 1998:117). In qualitative research therefore, the dependability of the research, as opposed to reliability, is used as a basis of evaluation. The use of an audit trail (Babbie & Mouton, 2001:278) is one strategy to demonstrate dependability.

\textsuperscript{24} Henning also points out that this is not a new idea and has been theorised by most qualitative research authors.
Remenyi *et al.* (1998:116) describe two ways in which this can be achieved:

- By keeping the evidence collected in an easily retrievable form, to enable others to investigate it should doubts regarding the research ever be raised.
- The researchers should keep a log cataloguing research design decisions and justifications for these.

### 3.9.5 A research evaluation framework for this study

Based on the discussions in this section, Table 3.3 outlines a framework for enhancing the confirmability of research outcomes of this study.

<table>
<thead>
<tr>
<th>Research Quality Imperatives</th>
<th>Strategies</th>
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<tbody>
<tr>
<td><strong>Credibility</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>Triangulation</em>: Use of multiple sources of evidence and research methods.</td>
</tr>
<tr>
<td></td>
<td><em>Referential adequacy</em>: Recording evidence.</td>
</tr>
<tr>
<td></td>
<td><em>Member checks</em>: Confirming evidence and research methods with informants and academic community.</td>
</tr>
<tr>
<td><strong>Transferability</strong></td>
<td><em>Thick descriptions</em>: Report findings with sufficient detailed description</td>
</tr>
<tr>
<td></td>
<td><em>Selecting informants purposively</em></td>
</tr>
<tr>
<td><strong>Dependability</strong></td>
<td><em>Audit trail</em>: Ensure evidence is accessible to evaluators of the study. Maintain log of research design decisions.</td>
</tr>
</tbody>
</table>

### 3.10 Conclusion

In this chapter, I have undertaken the following:

- In the introduction to this chapter, I used the Three World Framework (Figure 3.1) to indicate the inter-relationships between research philosophy (metaphysical world), research approaches and techniques (world of science) and the everyday world (the world of the research problem).
In the light of a number of questions raised in the literature regarding whether the study of IS is a valid scientific pursuit, I examined, in Section 3.3, the nature of the field of IS. I also placed the study of IS within a social science context. From this discussion I concluded that IS research, and hence this study, is indeed a valid scientific persuasion.

In Section 3.4, I compared and contrasted various philosophical underpinnings in Social Science research. In so doing I substantiated in Section 3.5 why the Critical Realist paradigm is an appropriate intellectual underpinning for this study.

In Sections 3.6 and 3.7, I concluded that the use of a qualitative approach would be best suited to this research. I furthermore argued that the use of semi-structured interviews is the best possible means to gather the necessary evidence for this study.

In Section 3.8, I presented a framework for the development of an ECIS success theory.

Lastly, in Section 3.9, I presented a framework to guide the outcomes of the empirical work towards an acceptable quality in terms of credibility, transferability, and dependability.

The synthesis of all of the above issues forms the basis of the research design of this study. The three-world framework (Babbie & Mouton, 2001) is used to represent the main tenets of this design (refer to Figure 3.4).

*Figure 3.4/*...
With the research design in place, the next logical step of the research process involved the execution of the fieldwork, and the analysis of evidence, which is discussed in the following chapter.
CHAPTER FOUR

STRATEGIES FOR THE COLLECTION AND ANALYSIS OF EVIDENCE

Science works with concepts of averages that are far too general to do justice to the subjective variety of an individual life.

(Jung, 1995)

Overview

At the heart of conducting an empirical study are the methods involved in the collection and analyses of evidence. The objective of this chapter is to discuss the implementation of these methods. The chapter firstly discusses how evidence was collected through semi-structured interviews. This includes an overview of how I selected knowledgeable informants from South African e-Commerce businesses. The next section of the chapter discusses techniques for analysis, and concludes that the best approach to take is to adapt the grounded theory method and apply both hermeneutical and reflexive interpretation. Following on this, details of the analysis are presented. I describe how analysis proceeded from inductive identification of concepts, to a higher-order narrative. Thereafter, I discuss how a computer-aided qualitative data analysis software (CAQDAS) package was used to facilitate the manipulation and interpretation of the evidence. Lastly, an overview is presented of the three main phases of the research.

4.1 Introduction

In a scientific inquiry, observation and interpretation are of necessity conducted within a set of guidelines (Babbie & Mouton, 2001:72). Having set out these guidelines in the previous chapter, the next step of the inquiry involves the implementation of the research. This focuses on the strategies and procedures involved in the selection of informants, evidence collection techniques, and approaches to the analysis of the evidence. The implementation of these strategies is directed at finding scientifically acceptable responses to the research questions.
4.2 The research questions and objectives

The research strategies had to facilitate the following objectives of the study:

- to enable a better understanding of the factors impacting on ECIS success;
- to explicate the central constructs and concepts associated with ECIS success; and
- to develop an ECIS success theory.

These objectives underpin the research questions. The questions were refined after an initial phase of fieldwork during which I consulted with several knowledgeable informants. What was clear from these discussions was that the pervasiveness of ECIS warranted a deeper understanding of internal business processes. The questions concerning ECIS success thus required a focus on the internal management perspectives. A deeper understanding, as opposed to a narrow investigation on any one possible ECIS success issue, was required. The research questions were subsequently formulated as follows:

In the selected e-Commerce environments:

1. How does ECIS contribute to successful business?
2. What are the drivers of ECIS success and how do they relate to one another?
3. What are the important management issues that affect the success of ECIS?

---

1 The term “informant” is used in this study, as opposed to “respondent”. Knowledgeable informants are the social actors who, on the basis of their extensive experience within a particular setting, provide rich, detailed information to the qualitative researcher. Refer to Kvale (1996:218-220) and Babbie and Mouton (2001:168) for a more detailed discussion on the role of informants in qualitative research.
4.3 Selection of research informants

The broader grouping from which informants were to be selected was defined as follows:

*The research population constitutes knowledgeable informants in e-Commerce businesses who have an in-depth understanding of the management of business operations. These informants would usually be vested with the responsibility for the successful outcome of the e-Commerce initiatives.*

Based on the above, the following categories of informants were identified:

- Managers of e-Commerce businesses who oversee operations and have either direct or indirect responsibility for the online products and services.
- IS or IT managers involved in the development, maintenance and support of ECIS.
- A third category of informants was identified during interviews, viz., managers who had experience as both IT and business managers.

I also extended this primary group of informants to include four consultants who had experience of e-Commerce businesses. Although they were not based in any single business operation, they were identified as a rich\(^2\) source of evidence. Consultants presented a broader range of e-Commerce experiences, as compared with the average manager who was associated with just one business. They therefore were able to provide “*insight-stimulating examples*” (Selltiz *et al.*, 1965) of ECIS success. Table 4.1 provides an overview of the background of the informants.

---

Table 4.1: Background of informants

<table>
<thead>
<tr>
<th>Area of experience</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Business</strong></td>
<td>29</td>
<td>45%</td>
</tr>
<tr>
<td><strong>IT</strong></td>
<td>22</td>
<td>34%</td>
</tr>
<tr>
<td><strong>Business &amp; IT combined experience</strong></td>
<td>7</td>
<td>11%</td>
</tr>
<tr>
<td><strong>Academic</strong> (interviewed in final phase for research evaluation only)</td>
<td>7</td>
<td>11%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>65</td>
<td>100%</td>
</tr>
</tbody>
</table>

One of the key elements of qualitative research entails working with a small number of informants who are purposively selected on the basis of salient criteria. Such selection entails selecting typical or interesting cases (Blaxter et al., 2001). Babbie and Mouton (2001:166) affirm that it is appropriate for the researcher to select informants on the basis of his own knowledge of the population, its elements, and the nature of the research aims.

As my aim was to understand successful implementation of ECIS, I sought out specific instances of business excellence in the field. I also took into account the size of the business (refer to Table 4.2).

Table 4.2: Number of businesses involved in the study according to size

<table>
<thead>
<tr>
<th>Size of business</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Small</strong></td>
<td>14</td>
<td>39%</td>
</tr>
<tr>
<td><strong>Medium</strong></td>
<td>8</td>
<td>22%</td>
</tr>
<tr>
<td><strong>Large</strong></td>
<td>14</td>
<td>39%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>36</td>
<td>100%</td>
</tr>
</tbody>
</table>
Initially I identified informants in well-known South African businesses\(^3\) that had successfully adopted e-Commerce. Of the 36 businesses from which informants were selected, seven have been identified in a recent report\(^4\) as being among the top ten online retailers in South Africa, viz., Pick ‘n Pay Home Shopping, Woolworths, Kalahari.net, Exclusive Books, Cybercellar, Netflorist, and Digital Planet. The informants whom I interviewed also made suggestions regarding other candidates they believed would be able to contribute valuable insights to the study.\(^5\)

I was also aware that the main concepts, or building blocks of the theory, would be discovered incrementally, as the process of analysis unfolded. Thus, as new concepts emerged, I needed to direct my attention to businesses that would provide me with more information, especially with regard to those concepts that needed further exploration and refinement. This is known as theoretical sampling, which is defined as

“…the process of data collection for generating theory whereby the analyst jointly collects, codes and analyses his data and decides what data to collect next and where to find them, in order to develop his theory as it emerges. The process of data collection is controlled by the emerging theory, whether substantive or formal”.

Glaser and Strauss (1967:45)

For example, during the early stages of analysis, concepts were grouped into a category named “customer-satisfaction”. However, these concepts needed further refinement and understanding. As a result, the next informant that I sought out was a manager of an e-Commerce business that had implemented customer-satisfaction evaluation strategies.

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\(^3\) This was based on two studies of e-Commerce activity in South Africa, viz., Goldstuck (2002) and World Wide Worx (2004).

\(^4\) A recent study of online retail activity in South Africa (Goldstuck et al., 2006:5) identified the top ten online retailing businesses in South Africa.

\(^5\) This is sometimes also referred to as a snowballing technique (Blaxter et al., 2001).
Lastly, other criteria that influenced the selection of informants included:

- **Enculturation**: this implies that the informant should have been sufficiently exposed or encultured to the practice of e-Commerce business.
- **Current involvement**: the informant would have to be currently or recently involved with e-Commerce business activities.
- **Adequate time**: the informant would have to be in a position to spare the time to contribute to the research, via the interview.\(^6\)

4.4 **Using the interview technique to gather evidence for the primary narrative**

The interviews formed a fundamental component of the evidence-gathering activity. The following sections discuss how I made contact with the informants, the drawing up of the interview schedule, the conduct of the interview, and the recording and transcription of the evidence.

4.4.1 **Making initial contact**

Cooper and Schindler (2003) recommend that some of the prerequisites for an interviewer should include sound communication skills, flexible schedules, willingness to tolerate intermittent work hours, and mobility. Although there were many difficulties in meeting all of these, I was able to conduct a sufficient number of interviews before a point of theoretical saturation\(^7\) was reached.

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\(^6\) Refer to Spradely (1979) for a more detailed discussion of each of these bulleted points.

7 Theoretical saturation is when the researcher reaches a point where collecting additional data is counterproductive, i.e., no new concepts and categories emerge during the coding process (Strauss & Corbin, 1998:136).
Once I had identified a business, I would communicate either through email or telephonically to establish the name of an informant. Fontana and Frey (1994) suggest that it is important to establish rapport with informants. Thus, wherever possible, telephonic communication was the preferred means to establish contact prior to a formal meeting. Moreover, I found that potential informants responded more positively to an emailed request for an interview after I had verbally outlined the purpose of the meeting. An example of an email request for the interview is provided in Appendix A. I developed standardised email content, and then modified this for each recipient, depending on the nature of what was discussed telephonically. A description of the project was also emailed to the prospective informant (see Appendix B).

4.4.2 The interview schedule

In keeping with the model of the researcher as a traveller (Kvale, 1996), the interview schedule (refer to Appendix C) did not consist of a detailed series of structured questions that were to be rigidly followed during the meeting. The interview, which was semi-structured, was conducted using the following guidelines proposed by Struwig and Stead (2001:98-99):

- The interviews were guided by the interview schedule consisting of questions that were used to direct the discussions with informants.
- Informants were allowed to go into more detail on those issues they considered to be important to ECIS success. The depth of each aspect of the topic covered was therefore dependent on each informant.
- I did not impose my viewpoint on the interviewees. Instead I assumed a passive role, but probed when I thought it was necessary or if I felt that the informant was reticent. This was an

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8 Lofland and Lofland (1995) describe this aspect of the interviewing technique in more detail.
especially useful strategy, as the informants usually were more open and offered more depth of information.

4.4.3 *Conducting the interview*

After some introductory remarks, I usually posed the following to the interviewee to prompt the commencement of the interview:

> “I would like hear your perspectives, as to what you consider as being the important issues with regard to being successful in e-Commerce. Specifically, how do you determine if the Information Systems deployed in this business are effectively serving your business objectives?”

The length of the interview was dependent on the time the informant had available. On average, most interviews were an hour in duration.

After seeking permission from the informant, I tape-recorded the interview.\(^9\) In keeping with the requirements of the university ethics committee, each informant received a signed letter, on a university letterhead, that gave an undertaking that the interview was being conducted in confidence, and that the recording was to be used solely for the purposes of the research. (Refer to Appendix D.)

In addition to the tape-recording, I also made detailed field notes while the interview was taking place. Appendix E provides an example of field notes. According to Babbie and Mouton (2001), extensive field notes are an important aspect of enhancing the credibility of research undertaken within the qualitative paradigm. The review of both extensive notes of interviews, as well as actual transcripts of the interviews, served to obtain a more in-depth and accurate understanding of the interactions

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\(^9\) There were four interviewees who preferred that the interview not be recorded. There were also occasions when I was asked to switch off the recording device, as the interviewee wished to make a point off the record.
with the informants, e.g., a transcript will not show that a business manager’s facial expression was negative when speaking about high volumes of on-line customer complaints that needed responses. The field notes also served as a means of crosschecking my interpretations of the transcribed discussions.

4.4.4 Transcription of the interviews

After each interview was conducted, the recordings were transcribed. The transcribing procedures involved three steps to ensure a high quality transcript. After an initial transcription of the interviews, the tape and the first version of the recording were given to a colleague who listened to the tape and checked for inaccuracies. Thereafter, before coding the transcripts and field notes, I listened to the tapes again to ensure accuracy. The transcriptions and the field notes were used as a basis for developing the higher-order narrative. During the process of coding, it was often necessary to listen to parts of the tape for a third time, especially in instances where there was some possible ambiguity in the transcribed text. I also discovered that by listening to the recording during coding, I was able to mentally recreate the interview setting. This served to enrich my interpretation of the evidence.

4.4.5 Interviews in three phases of the study

A total of 65 interviews were conducted. Interviews were conducted at the three major centres in South Africa, viz., Cape Town, Johannesburg and Durban, and took place mainly at the business premises of the participants. There were a few informants that preferred to meet at a neutral venue such as a coffee shop. The evidence was collected over a three-year period, between March 2003 and November 2005. Appendix F provides a detailed schedule of the dates of the interviews, together
with pertinent details of the interviewees and the business sector to which they belonged. ¹⁰

In all there were three phases of the study during which interviews took place:

- During the exploratory phase of the research, I undertook a series of eight interviews between March 2003 and June 2003. In addition to this, I also conducted a focus group and knowledge café session with two groups of informants. The primary purpose of the exploratory phase of the study was to verify the research problem, and to refine the research questions.

- The main body of evidence was compiled between June 2003 and December 2005, during which I conducted 43 interviews. This also included conducting a case study of the well known South African e-Tailer, Kalahari.net™, as a case study to assist in identifying initial concepts related to ECIS success.

- I revisited a final group of seven informants between July and September 2006, for the purposes of refining and confirming the findings. In addition to these informants, I also conducted seven interviews with academics from both South African and overseas universities as part of the strategy to improve the credibility of the research.

### 4.5 Analysing the evidence

The next important consideration involved analysing the evidence in order to identify relevant concepts for the primary narrative (step 2 of the theory development strategy). In addition to the interview transcripts, the

¹⁰ Note that a commitment of confidentiality was given to each informant. Therefore pseudonyms are used in the reporting of this research. Furthermore, only a description of the business is provided. A full list of businesses that participated in the study is provided in the acknowledgments section at the beginning of the thesis. Actual names of informants, and the businesses they represent, can be made available for an audit if necessary.
evidence also included summaries of field notes, and pertinent documentation regarding each business. This documentation was either gleaned from the business website or was in the form of documentation provided by the informant (see Appendix L for an example of this documentation). Figure 4.1 shows the different sources of evidence, and how they relate to one another.

![Figure 4.1: The different sources of evidence used in the study](image)

Analysis involves the interplay between researcher and the evidence (Strauss & Corbin, 1998). This process therefore forms the bedrock of the research outcomes, and requires careful consideration before embarking on any particular approach. In this study the strategies regarding how to analyse the evidence were informed by the following considerations:

- The evidence consisted mainly of textual data.
- The analysis strategy needed to facilitate the development of a theory.

Following on the above, I initially identified the following strategies that would be suitable for data analysis, viz., content analysis, discourse analysis and grounded theory method (GTM). After careful consideration
of previously completed research in IS theory development over the last decade, I found that the GTM was a widely adopted method. However, after an initial stage of evidence collection, and analysis thereof, I identified a number of problems with the traditional GTM.

4.5.1 Grounded Theory Method (GTM)

GTM can be described as an inductive, theory-discovering methodology that allows the researcher to develop a theoretical account of the general features of a topic while simultaneously grounding the account in empirical observations (Martin & Turner, 1986:141). According to Denzin (1994:508), the GTM is the most widely used qualitative interpretive framework in the social sciences. The GTM has dual roots, one in symbolic interactionism in the person of Strauss, and the other in the statistically-oriented positivism that was part of Glaser’s intellectual repertoire (Alvesson & Sköldberg, 2000:12). Strauss and Corbin (1998:12) describe grounded theory as

“...theory that was derived from data, systematically gathered and analysed through the research process. In this method, data collection, analysis, and eventual theory stand in close relationship to one another. A researcher does not begin a project with a preconceived theory in mind. Rather, the researcher begins with an area of study and allows the theory to emerge from the data ... Grounded theories, because they are drawn from the data, are likely to offer insight, enhance understanding, and provide a meaningful guide to action”.

Tesch (1990:78) proposes that GTM is an appropriate technique for analysis when the following qualitative research interests exist: “the characteristics of language; the discovery of regularities; the comprehension of meaning; and reflection”. She further explains that the

11 This was based firstly on my reading of the literature, and studies such as Berghout and Remenyi (2005) and Nasir (2005) that conducted analyses of trends in previous research.

12 As advocated by Glaser and Strauss (1967) and Strauss and Corbin (1998).
discovery of regularities refers to the identification and categorisation of elements and the exploration of their connections (Tesch, 1990). This description aptly describes what this study aimed to achieve, i.e., to discover regularities (or common patterns) in the way success indicators of IS present themselves within e-Commerce businesses, and to identify and explore connections between these indicators with a view to deriving a theory. Travers (2001:42) points out the following important principle of the GTM:

"..an analyst should use a codified procedure for analysing data, which allows readers to understand how the analyst obtained his theory from the data".

The grounded theory thus emerges through the process of concept discovery whereby the researcher moves from data to abstract concepts and categories. The processes of description, definition and specification of relationships achieve this. The resultant theory is attributed to the researcher's moving to a level of representation where the concepts form a theoretical framework (Huberman & Miles:1994).

Babbie and Mouton (2001:499) offer a rather insightful view of the GTM:

“Grounded theory holds as a basic tenet that qualitative researchers do not go around testing hypotheses to add to an already existing body of knowledge, but rather that they ‘do not know what it is they do not know’.”

Given the foregoing definitions and descriptions, and keeping in mind the main tenets of the research design described in Chapter Three, the GTM appeared to be a relevant approach to use in this study. However, I found that the problems with GTM were not easily identifiable from broad descriptions of its purpose, such as those above. Rather the problems, which arose after I conducted a trial run, existed in two areas. The first concerned the specifics of the laborious techniques advocated by its original proponents, viz., Strauss and Corbin (1998). The second related to the principal point of departure that grounded theorists were supposed
to take. These problems were also identified by other researchers such as Bannister et al. (2006), who highlight that many researchers consider GTM to be excessively onerous, and Allan (2003), who also reports on the difficulties in applying GTM techniques.

4.5.2 Problems with the GTM (1): The conundrum of the tabula rasa & the role of reflexive interpretation & hermeneutics

One of the problems that Bannister et al. (2006:40) identify with the GTM, is the “requirement that this approach to research should be without influence from what is already known about the subject”. They go on to argue that this “is not achievable and probably not even desirable”. Denscombe (2003:127), in taking a similar view, advises that

“The need to approach things with an open mind is a fundamental principle of the grounded theory approach but, in practice, it raises some awkward questions. Researchers are inevitably influenced by prior conceptions based on their own culture and personal experience.”

In noting the above concerns, I realised that the principle of approaching the evidence with a neutral, unbiased view was not always feasible. This also conflicted with my epistemological stance on critical realism. I was also mindful of Alvesson and Sköldberg’s (2000:36) conclusion to this problem:

“Grounded theory’s striving for a totally unbiased approach thus means that pre-conceptions come in any way, but by the back door and in an unreflecting way, either in the shape of rationalistic assumptions or as adaptations to the actor’s circumstances.”

Therefore my first point of departure from traditional GTM was to recognise that as a researcher I was an integral part of the social world being studied, and as such I could not remove myself from it. In keeping with the critical tradition, I acknowledged that a researcher has biases and hence is not neutral. Consequently, I chose to concede this potential bias rather than claim that my findings stem from a tabula rasa. Thus it
was more realistic to engage in reflexive interpretation\textsuperscript{13} of the evidence, which makes a demand for reflection in research in conjunction with interpretation at several levels. This includes that of contact with empirical materials, awareness of the interpretive act, and the clarification of political-ideological contexts. Interpretation in this approach implies that

\begin{quote}
"there are no self-evident, simple or unambiguous rules or procedures, and that crucial ingredients are the researcher’s judgement, intuition, and ability to see and point something out".
\end{quote}

(Alvessön & Skoldberg, 2000:248)

The second point of departure to traditional GTM involved the use of hermeneutic principles to facilitate the interpretation of the data. In Chapter Three, I discussed the hermeneutic dimension of critical realism, and its role as an analytical tool for interpreting textual data. Thus in keeping with the critical realist underpinning of this study, as well as the requirements of reflexive interpretation, e.g., greater awareness of the interpretive act, hermeneutic principles were also used to facilitate the interpretation of the evidence. This involved constant reflection of each of the parts of the hermeneutic circle, i.e., the key-points\textsuperscript{14} that I inductively identified in the evidence, in relation to the whole, i.e., ECIS success. As a result of frequent relating of the parts to the whole and vice versa, I was able to reflexively interpret the textual evidence, which eventually led to the findings of this study. This combination of hermeneutical and reflexive interpretation provided an acceptable scientific lever to apply to the evidence.

\textsuperscript{13} As advocated by Alvessön and Skoldberg (2000:238-248).

\textsuperscript{14} This refers to the key point identified during coding and is discussed in Section 4.5.3.
4.5.3 Problems with Grounded Theory Method (2): Microanalysis

Many practitioners of qualitative research have adopted criteria rooted in the positivistic paradigm to emphasise the validity of their methods and the various strategies they have developed to minimise bias and subjectivity (Pozzebon, 2003). This is exactly the problem that was identified with the GTM. The arduous nature of microanalysis, as proposed by Strauss and Corbin (1998), is unduly mechanistic. Furthermore, this approach resonates with the inflexibility of criteria used to argue for validity and objectivity, which are usually adopted within the positivist paradigm. This is in contrast to the qualitative approach of this study.

Strauss and Corbin (1998) recommend that microanalysis be conducted at the beginning of a study to generate initial categories along with their properties and dimensions. This entails a careful, often minute examination and interpretation of data (Strauss & Corbin, 1998:58). An example of using microanalysis is demonstrated by these researchers through a transcribed excerpt of a discussion between a group of university students and their teacher (Strauss & Corbin, 1998:61).

Field note quotation:
When I heard the diagnosis, it was scary. I panicked. Everything was doing well early in this pregnancy, and I felt good - no morning sickness, and I had a lot of energy. Then all of a sudden, I was told I had diabetes...”

Discussion and commentary:
Teacher: Let's focus on the first word, “when.” What could “when” mean?
Student: It represents time to me. A point in time. Some time indeterminately, in the past.
Teacher: Well, it could stand for some time in the future....

The discussion and commentary shown in Figure 4.2 is just a small excerpt of almost four pages of the transcript on the use of the word “when” by the interviewee. While this microscopic examination of
interviews may have value in some research projects, I found it that it was tedious and cumbersome for this project. Moreover, it was clear that microanalysis of just one transcript entailed an excessive amount of time. As the continued use of this approach would set back the project timeframes by many months, if not years, I needed to review the use of the technique. Additionally, I found that microanalysis led to confusion, as I was interrogating the evidence at an unnecessary level of detail in an attempt to interpret what the informant was saying in the interview. I also realised that by engaging in microanalysis, I was becoming distracted from the principal research questions of this project. Glaser (1992:40) is also critical of such an approach calling it “over-conceptualisation”.

Thus after initially practising microanalysis, I decided that a better approach was to identify “key-points” that had some bearing on the main research questions. Allan (2003:2) describes key-point coding as identifying “the points regarded as important to the investigation”. Although Strauss and Corbin stress the use of microanalysis as described above, they do however suggest that “the analyst also might code by analysing a whole sentence and paragraph” (Strauss & Corbin, 1998:120). Key-point coding therefore was a more acceptable means of applying GTM in that it did not warrant a tedious microscopic examination of each and every word in the transcript.

4.5.4 An adapted approach to analysing the evidence

After taking into consideration the problems with the pure GTM, my approach to the analysis of the evidence was follows:

- Firstly, the interpretation of the evidence was through a combined process of reflection (Alvesson & Sköldberg, 2000) and the application of hermeneutical techniques (Klein & Myers, 1999).
Secondly, I opted to code the data through the identification of “key-points” (Allan, 2003) as opposed to in-depth micro coding (Strauss & Corbin, 1998).

In summary, the use of reflection, hermeneutics, and adapted GTM, together with the influences of critical realism (CR), formed a cohesive tripartite approach to the analysis and interpretation of the evidence. This is represented in Figure 4.3.

**Figure 4.3: A tripartite approach to the analysis of the body of evidence**

A high-level description of the procedure adopted was as follows:

- Transcribe interview and field notes and reflect on the contents of the transcript, using hermeneutical principles.
- Compare transcripts with field notes, pertinent information drawn from the business website, and any documentation provided by the informants. Note any inconsistencies that are apparent.
- Replay tape and “cleanse” transcript, i.e., ensure accuracy of transcript as compared with the verbal interview.
- Further reflection of evidence.
- Conceptualise, i.e., conduct key-point coding.
4.6 Theory development: from concept creation to a higher-order narrative

Step two of the strategy that was adopted for theory development involved concept creation. According to Strauss and Corbin (1998:103), this is the first step in theory building. The act of conceptualising is referred to as coding. The purpose of coding is to

“build rather than test theory; to provide the researcher with analytical tools for handling masses of raw data; to help analysts to consider alternative meanings of phenomena; to be systematic and creative simultaneously; and to identify, develop, and relate the concepts that are the building blocks of theory”.

Strauss and Corbin (1998:12-13)

The process of coding was undertaken using methods advocated by Strauss and Corbin (1998) in the main. This includes conceptualisation, categorisation of concepts, and axial coding. Reflection and hermeneutical interpretation are especially important in the process of coding.

4.6.1 Conceptualising

Conceptualising is an abstract representation of an event, object, or action/interaction that a researcher identifies as being significant in the data. The purpose behind naming phenomena is to enable researchers to group similar events, happenings, and objects under a common heading or classification (Strauss & Corbin, 1998:103). In conceptualising, data is broken down into discrete incidents, ideas, events, and acts, with each of these being given an appropriate label. The label that the researcher selects for the objects may be determined by “the imagery of meaning they evoke when examined comparatively and in context, or the name may be taken from the words of respondents themselves” (Strauss & Corbin, 1998:105). Examples of concepts
identified from the key-points of the transcripts in this study included site visibility, data quality, change management and risk assessment.

4.6.2 Categorisation: grouping of concepts

After an initial set of concepts has been identified, the researcher selects those that can be grouped under a more abstract higher-order set, referred to as categories (Strauss & Corbin, 1998:113). Strauss and Corbin (1998) recommend that the name of a category should be the most logical descriptor of what is going on in the data and is dependent on the perspective of the analyst, the focus of the research, and the research context. For example, in this study, the concepts software testing, systems quality, conversion rate were grouped together into a category named ECIS evaluation. Table 4.3 presents an overview of the categories derived.

Table 4.3/…
Table 4.3: Categories of concepts that were inductively derived from the evidence\textsuperscript{15}

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>KEY ECIS FUNCTIONS &amp; FEATURES</td>
<td>Key features and functions of ECIS that were identified as being important, and in some cases mission-critical.</td>
</tr>
<tr>
<td>1 ECIS EVALUATION</td>
<td>Approaches used to evaluate ECIS success.</td>
</tr>
<tr>
<td>2 BUSINESS MANAGEMENT</td>
<td>Specific business management issues that were deemed to have an effect on ECIS success.</td>
</tr>
<tr>
<td>3 ECIS DEVELOPMENT</td>
<td>Aspects related to the development of systems that were contributory to successful ECIS.</td>
</tr>
<tr>
<td>4 BUSINESS &amp; IS RELATIONSHIP</td>
<td>Issues pertaining to the relationships between the actors involved in the management of the e-Commerce business and ECIS that impacted on success.</td>
</tr>
<tr>
<td>5 CUSTOMER-FOCUSED</td>
<td>Highlights the importance informants attached to being customer-focused</td>
</tr>
<tr>
<td>6 MANAGEMENT OF ECIS</td>
<td>Aspects concerning the management of ECIS that were related to success.</td>
</tr>
<tr>
<td>7 AGILITY &amp; INNOVATIVENESS</td>
<td>Business and ECIS management practices that enabled flexibility and agility in maintaining systems, and in being responsive to the external business environment.</td>
</tr>
<tr>
<td>8 COSTS OF ECIS</td>
<td>The costs of developing and maintaining ECIS were cited as being prohibitive to e-Commerce success.</td>
</tr>
<tr>
<td>9 HIGH RELIANCE ON ECIS</td>
<td>Highlights how the e-Commerce business has an increased reliance on ECIS as compared to brick &amp; mortar business.</td>
</tr>
</tbody>
</table>

4.6.3 Axial coding

The purpose of axial coding is to reassemble the concepts identified during open-coding (Strauss & Corbin, 1998:124). Thus the refinement of the evidence continues by coding along the axis of each category. In certain cases, sub-categories are identified. Categories are then related to their sub-categories to form more precise and complete explanations about phenomena. For example, the sub-categories that were coded along the axis of the “Business & IS Relationship” category were: turnaround time, service-level agreements, differing perspectives, business taking responsibility, and importance of joint team. Details of

\textsuperscript{15} Note that each row in this table represents a high-level category. Within each category a number of concepts were coded along the axis of the category into sub-categories, details of which are presented in Chapter 5.
axial coding of the categories are made explicit in the discussion in Chapter Five.

4.6.4 Preparing the evidence for the Higher-order Narrative (HON)

Using a constant comparative method (Glaser & Strauss, 1967:105-115) categories are then linked with one another to identify the central themes relating to the research questions (refer to Figure 4.4). There were no rules that guided how the categories should be linked together. Rather the linking of categories was a result of reflection on the body of evidence. The resultant themes constituted the basis of the higher-order narrative.

![Figure 4.4: Interlinking of categories to form themes](image)

4.6.5 From themes to theory

After careful reflection on, and introspection of each of the themes in the findings, I set out to identify a coherent set of relationships between the
principal concepts. This process of abstraction and juxtaposing of the themes resulted in the final theory, which is presented in Chapter Six.

Finally, it is important to note that, even though these analytical processes described above appear to be a linear process, in practice this is by no means the case. From the experience of applying the adapted GTM in this study, I found that I had to constantly move back and forth between each step, and between different sets of evidence. This was the only option for this methodology to succeed in grounding the resultant theory in the body of evidence. An overview of the entire analysis approach is depicted in Figure 4.5.

**Figure 4.5: The iterative processes in analysing the evidence**

- **Conceptualising**: This is an abstract representation of an event, object, or action/interaction identified from key-points as being significant in explaining ECIS success.
- **Establish Categories**: Identify those concepts that can be grouped under a more abstract higher order concept or category.
- **Axial Coding**: Continue refining the evidence by coding along the axis of each category. Categories are related to their sub-categories to form more precise and complete explanations about ECIS success.
- **Develop Themes**: Categories are linked with each other to form a theme. The themes form an explanatory underpinning of ECIS success. These are represented as the findings in Chapter 5.
- **Emergence of a Theory**: Constant reflection on the evolving analyses of data
4.7 Using a Computer-Aided Qualitative Data Analysis Software (CAQDAS) package to manage a large body of evidence

Each interview transcript yielded an average of approximately 7500 words.\(^{16}\) After the first few interviews were transcribed and coded, using manual, i.e., pen and paper methods (see Appendix G for an example), I realised that the analysis would become cumbersome as the body of evidence expanded. Indeed at the end of the coding process, a total of approximately 850 pages of transcripts, comprising about 220 000 words of text, had been word-processed. In order to make the coding process more manageable, I consulted various texts on both qualitative research as well as the application of the GTM, e.g., Henning (2004), Strauss and Corbin (1998), Babbie and Mouton (2001). Based on the advice offered by these authors, I opted to use a CAQDAS tool to facilitate the analysis process.

4.7.1 What is CAQDAS?

The use of a CAQDAS should not be construed as having the same function as data analysis software such as SPSS that is often used in quantitative research paradigms. Most CAQDAS packages are currently designed not to undertake the analysis for the researcher, but rather to *facilitate* the process. A strong feature of CAQDAS is its ability to increase the rigour and manageability of qualitative data (Babbie & Mouton, 2001:503). A qualitative research project inevitably processes an extraordinarily large amount of unstructured textual data. As such, the management of this data poses a serious challenge to the researcher (Henning, 2004:129). Moreover, CAQDAS frees the researcher from the drudgery of using the manual methods of coding, comparing, and categorising. The researcher is thus free to focus on the acts of reflecting on the data, and identifying and relating concepts pertinent to the study.

\(^{16}\) Appendix H provides an excerpt of a transcribed interview.
Chapter 4: Strategies for the Collection & Analysis of Evidence

After some investigation and consultation of a number of websites and texts such as Weitzman and Miles (1995), I opted to use the QSR NVivo (Version 2) CAQDAS package. The following extracts from the software user guide provide a synopsis of the capabilities of this software:

“NVivo provides a range of tools for handling rich data records and information about them, for browsing and enriching text, coding it visually or at categories, annotating and gaining access to data records accurately and swiftly...

NVivo has tools for recording and linking ideas in many ways, and for searching and exploring patterns of data and ideas. It offers ways of connecting the parts of a project. As you link, code, shape and model data, the software helps you manage and synthesize your ideas, constructing and testing answers to research questions...

The software helps you to manage and synthesize your ideas, providing a range of tools for clarifying understanding of the data and for arriving at answers to research questions”.

(QSR International, 2002)

4.7.2 Using NVivo to conduct analysis/...
4.7.2 Using NVivo to conduct analysis

In applying my chosen theory development strategy, key points were inductively identified by “trawling” (Remenyi et al., 1998) the higher-order narrative in the early stages of analysis. These key-points (refer to Figure 4.6) were coded into “free Nodes” in NVivo (refer to Figure 4.7) and formed an initial set of concepts, which would be organised into categories later.

![Figure 4.6: Key-point coding in Nvivo](image)

![Figure 4.7](image)
As further interviews were conducted, transcribed and analysed, the coding process began to yield further concepts that related to one another. This led to a reorganisation of codes into tree structures (refer to Figure 4.8) with the idea that each tree contained a group of conceptually linked items.
Throughout the analysis process, it was also important to annotate certain parts of the transcripts. Strauss and Corbin (1998) refer to this as memos. The purpose of memos is to allow the researcher to note why he arrived at a particular interpretation. Memos are also useful when the researcher is not sure about the meaning of something, and would prefer to return to this later. NVivo facilitates the use of memos by providing a feature called a “databite”, shown in Figure 4.9.

Figure 4.9: Using the “DataBite” feature of NVivo to annotate interview transcripts
4.7.3 Using the content analysis feature of NVivo to support interpretation of the evidence

Remenyi et al. (1998:130) offer the following advice regarding the development of a narrative:

“It is interesting to note that some individuals have much greater skill at narrative thinking than others and it is perhaps this skill which attracts them to qualitative research. For others, narrative thinking on its own may be too difficult or there may not be sufficient structure to allow them to proceed with confidence. Various quantitative techniques, such as content analysis (Berelson, 1952) and correspondence analysis may therefore be used to help develop a higher-order narrative…”.

In the light of this advice, I subjected the evidence to content analysis as a means of supporting my interpretations of the data. Furthermore, as a critical realist, I was not completely averse to the use of quantitative analysis. NVivo has a useful content analysis feature. This was utilised to produce the results shown in Table 4.4.

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>COUNT</th>
<th>%</th>
<th>Accum. %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 KEY IS FUNCTIONS OR CHARACTERISTICS</td>
<td>285</td>
<td>21</td>
<td>21</td>
</tr>
<tr>
<td>2 IS EVALUATION</td>
<td>244</td>
<td>18</td>
<td>40</td>
</tr>
<tr>
<td>3 BUSINESS MANAGEMENT</td>
<td>244</td>
<td>18</td>
<td>58</td>
</tr>
<tr>
<td>4 IS DEVELOPMENT</td>
<td>163</td>
<td>12</td>
<td>70</td>
</tr>
<tr>
<td>5 BUSINESS &amp; IS RELATIONSHIP</td>
<td>125</td>
<td>9</td>
<td>80</td>
</tr>
<tr>
<td>6 CUSTOMER-FOCUSED &amp; E-SERVICE QUALITY</td>
<td>114</td>
<td>9</td>
<td>88</td>
</tr>
<tr>
<td>7 IS MANAGEMENT</td>
<td>56</td>
<td>4</td>
<td>93</td>
</tr>
<tr>
<td>8 AGILITY &amp; INNOVATIVENESS</td>
<td>48</td>
<td>4</td>
<td>96</td>
</tr>
<tr>
<td>9 HIGH COSTS</td>
<td>37</td>
<td>3</td>
<td>99</td>
</tr>
<tr>
<td>10 HIGH RELIANCE ON IS</td>
<td>14</td>
<td>1</td>
<td>100</td>
</tr>
<tr>
<td>TOTAL COUNT</td>
<td>1330</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The content analysis, in part, facilitated the development of the HON. It is important at this point to emphasise that the quantitative yield of each category was not the primary basis on which the findings of the study were derived. Rather the content analysis provided an alternative avenue to interrogate the findings that I had inductively derived from the evidence through the application of the tri-partite analytical techniques (Figure 4.3) and through the process of coding, categorising and thematic linking. The central role of content analysis was to offer a comparative basis regarding the frequency of concepts in the evidence. In constructing the HON I had to reflect not only on the high-frequency concepts, but also on the low-frequency ones. By probing the evidence I had to ask questions regarding why there were low and high counts of certain concepts. This in turn aided the development of the narrative. The content analysis outputs from NVivo are presented in Appendix I.

4.8 An overview of the phases of the research

The journey through this research project was essentially one of discovery. At various junctures I assessed progress and discussed these with my doctoral supervisor and other research experts. Based on these assessments, I had to take decisions on how to proceed. These decisions were driven in part by the research design, as well as by experience gained as the study progressed. Table 4.4 presents a high-level view of the three phases of the research.

---

17 For example the category “customer-focused and service quality” in itself does not equate to the theme “Customer Centricity”. This category together with the categories “ECIS evaluation”, “business management”, “business and IS relationship”, “management of ECIS”, and “agility & innovativeness” jointly contributed to the development of the “Customer Centricity” theme (Refer to Figure 5.1 in Chapter 5).
### Table 4.4: A high-level overview of the phases of the research

<table>
<thead>
<tr>
<th>Phase 1 Exploratory</th>
<th>Phase 2 Collection of substantive evidence</th>
<th>Phase 3 Confirmation of findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Preliminary literature review.</td>
<td>iv. Case study conducted with well-known South African online retailer, Kalahari.net (refer to Appendix J) to identify initial concepts.</td>
<td>viii. A further 14 interviews conducted with e-Commerce stakeholders and academics to confirm and verify research findings.</td>
</tr>
<tr>
<td>ii. Exploration of the topic through a knowledge café and a focus group leads to refinement of research questions.</td>
<td>v. A total of 43 interviews conducted in this phase at which point theoretical saturation was reached</td>
<td>ix. Based on the input received above, the research findings were refined and finalised.</td>
</tr>
<tr>
<td>iii. 8 interviews conducted in field to substantiate research aims – leads to broader research focus.</td>
<td>vi. Data analyses in this phase facilitated with the use of NVivo.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>vii. First draft of findings and theory derived.</td>
<td></td>
</tr>
</tbody>
</table>

### 4.9 Conclusion

In this chapter the research methods used to conduct this study were presented. This included the following:

- A description of the factors that had an influence on my choice of methods.
- The methods involved in selecting and conducting interviews with knowledgeable informants from e-Commerce businesses.
- The use of an adapted GTM.
- The use of hermeneutics and reflection to interpret evidence.
- A motivation for, and description of, the use of a CAQDAS in the form of NVivo (Version 2).

This chapter provides an account of the rigour of the research strategies employed in this study, as well as the careful thought and planning that went into the analysis of the evidence. This therefore sets the stage for
a detailed reporting of the findings, in the form of a higher-order narrative in the next chapter.
CHAPTER FIVE
RESEARCH FINDINGS: TOWARDS AN ECIS SUCCESS THEORY

There is no such thing as unmediated data or facts; these are always the results of interpretation.  
(Alvesson & Sköldberg, 2000)

Overview
Since my first encounter with knowledgeable informants, answers to the questions concerning ECIS success have been developing. As the number of interviews increased, my understanding of the issues involved continued to evolve and mature. The findings presented in this chapter are representative of this evolving enquiry in my quest to develop an ECIS Success Theory. These findings advance the development of theory to its next stage. Through further reflection, and the inter-linking of categories that were derived through analysis, six themes emerged. These themes form the basis of the higher-order narrative, which is presented in this chapter. This narrative, being the penultimate step in the development of theory, articulates a detailed response to the principal research questions of this study. It is based on the collective body of evidence and provides both a rich and detailed insider-view of how ECIS is deployed and managed within the South African e-Commerce businesses that were studied.

5.1 Introduction

This chapter advances the development of the ECIS Success Theory to the next logical step, i.e., the presentation of a higher-order narrative. Using Remenyi and co-authors’ definition of a higher-order narrative (Remenyi et al. 1998:126) as a point of departure, it can be described thus:

*A higher order narrative captures the salient aspects of the information represented in the primary narrative. It also presents sufficient detail of each of the findings, which were inductively derived during analysis. The level of detail is*
demonstrative that the findings are grounded in the evidence. The higher order narrative provides a foundation for further reflection on the evidence, and the consequent derivation of theory.

The higher-order narrative was developed through reflection and hermeneutical interpretation of the concepts and their associated categories. By interlinking the categories, six themes were derived (refer to Figure 5.1). These themes, in forming the basis of the research findings, represent my insight and interpretation of the evidence and how they relate to the questions concerning ECIS success.

<table>
<thead>
<tr>
<th>FINDINGS -&gt;</th>
<th>FINDING 1</th>
<th>FINDING 2</th>
<th>FINDING 3</th>
<th>FINDING 4</th>
<th>FINDING 5</th>
<th>FINDING 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>CATEGORIES</td>
<td>CUSTOMER CENRICITY</td>
<td>HARMONIZATION OF BUSINESS &amp; IS MINDSETS</td>
<td>AGILITY OF THE IS FUNCTION</td>
<td>MANAGING ECIS QUALITY</td>
<td>CONTINUOUS EVALUATION</td>
<td>ECIS : DIRECT FACILITATOR OF BUSINESS SUCCESS</td>
</tr>
<tr>
<td>ECIS FUNCTIONALITY</td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECIS EVALUATION</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>BUSINESS MANAGEMENT</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>ECIS DEVELOPMENT</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BUSINESS &amp; IS RELATIONSHIP</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CUSTOMER-FOCUSED &amp; SERVICE QUALITY</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>MANAGEMENT OF ECIS</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>AGILITY &amp; INNOVATIVENESS</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>COSTS OF ECIS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>HIGH RELIANCE ON ECIS</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

Figure 5.1: Relationships between categorised concepts and the findings
(Shaded cells indicate the principal category underpinning the finding)
The narrative presented in this chapter, articulates a detailed response to the principal research questions of this study. It is based on the collective body of evidence and provides both a rich and detailed insider-view of the e-Commerce businesses that were studied. The higher-order narrative is particularly enriched by extensive references to detailed explanations from the body of evidence.

5.2 A generic ECIS configuration

The various components of ECIS infrastructure that are referred to in the narrative that follows, warrant some clarification. Figure 5.2 represents a generic configuration of ECIS infrastructure.

![Diagram of ECIS infrastructure](image)

Figure 5.2: A generic configuration of ECIS infrastructure

This is a conceptual diagram and does not indicate hardware elements such as servers and networking infrastructure. Rather, this configuration
is the result of my interpretation of how the businesses that were involved in this study combined various ECIS in their e-Commerce operations. The various arrows represent high-level information flows. Not all the components depicted in this diagram may be necessary for all e-Commerce businesses, e.g., certain businesses did not use a logistics management system.\(^1\) Similarly there were some businesses that included additional systems in their configuration, e.g., an IS fault-reporting system.\(^2\) As a high-level configuration, systems such as payments systems, shopping carts, as well as detailed information flows, are omitted. Appendix K presents a more detailed description of each of the components in Figure 5.2.

5.3 Finding One /…

\(^1\) Some of the businesses that were studied, especially those with smaller volumes of sales, used manual processes to organise the picking, packaging and shipping of goods.

\(^2\) Businesses that had adequate financial resources were able to extend their ECIS infrastructure to include systems such as Conlog to manage IS fault reporting.
5.3 FINDING ONE: Customer-Centricity

Customer-Centricity (CC) is not simply a result of how well designed the web-interface is. Rather CC is deeply embedded in the design of all components of ECIS. CC involves developing systems that consider both the direct and indirect impact they have on the level of service experienced by the customer. Whereas the current literature discusses e-Service quality from a purely marketing perspective, focusing on customers’ perceptions of website functionality, successful e-Commerce businesses understand that the so-called back office systems such as the DBMS, order processing, and management reporting systems are just as crucial in satisfying customers’ expectations, and are therefore also a CC issue.

5.3.1 Introduction to Finding One

The following two excerpts from the interview transcripts, demonstrate that e-Commerce managers were of the view that online customers have higher expectations, and are generally difficult to satisfy:

“…the demand on speed in the Internet environment is really huge, much higher than in brick and mortar [business]. What I mean by speed is that when walk you into a shop and there’s no toothpaste you don’t mind – You just say, ‘I’ll get it next time’. If you go to the Internet shop and there is no toothpaste, the business gets e-mails and complaints like you can’t believe. So the demand of the customer is much higher than in the brick and mortar” (De Goede, 2004).

“…because ultimately with online shopping it is the service, you know, it’s so much different ...When you do conventional shopping [in brick & mortar stores], and something is out of stock you can pick an alternative. Now with online shopping if you, as a customer don’t get what you order... you’re [meaning the business] in hot water” (Rutter, 2005).

Terms such as “customer service”, “customer experience” and “customer satisfaction” were cited frequently in the transcripts, e.g., Harris (2005), Wannenburg (2005), Meyer (2005) and on businesses’ websites. The higher expectations of the online customer, and their low tolerance of
poor service, require that e-Commerce businesses be managed with a customer-centric ethos. Thus, the ECIS as an important facilitator of e-Commerce have a key role in supporting CC. This finding therefore is concerned with the elevated need in e-Commerce businesses for ECIS to be designed, deployed and managed within a customer-centric mindset, as portrayed by the following interview excerpt:

SP: “Why do you view your IS to be a success in this business?”

RB: “IT is an enabler – it enables our customers to interact with us in a way that is easier for them. And therefore it is important to know if our customers are able to get through the process and afterwards have a warm, fuzzy feeling that: ’Hey that was pretty cool, painless and easy to do’.” (Bothma, 2005).

There were two dominant perspectives that underpinned the CC theme. Firstly, most informants tended to respond to the question concerning e-Commerce success by referring to the importance of their customers. Concepts related to CC and service quality were closely aligned to business success. The following excerpts, which are examples of responses from informants who regarded themselves as being successful, bear this out:

SP: “OK, you said this definitely is a successful, business. What do you mean?”

CA: “I think here we’ve got a lot of established customers who are happy clients. They order from us, some of them order from us on a daily basis. You know you don’t get too many people that do the online scenario. And it’s just, that they’re happy, because we know them by their first names and they know us by our first names, and that’s the kind of relationship we want to have with our customers. So when I say successful it is in that respect” (Azeem, 2005).

SP: “You say that the way your business operates is unique? Have you differentiated yourselves in any way that makes you more successful?”

WM: “Ja [sic]. We are successful because we got the big slogan here. That slogan is TCE (Total Customer Experience). For us to be a world-class business, we’ve got to make sure every single dealing that a customer has with the business is world class whether it’s placing an order, surfing the website, receiving an order, the way it’s packaged. He needs to have a total customer experience with us and that customer experience needs to be consistent throughout” (Meyer, 2005).

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3 As compared with brick and mortar businesses.

4 Note that in cases where the interview excerpt contains a conversation between interviewer and informant, the initials “SP” refer to the voice of the interviewer, i.e., Shaun Pather. The interviewee’s “voice” is indicated by his initials, e.g., “RB” in this instance. The source of the excerpts is indicated by the reference at the end of the quote. This convention is adhered to throughout this chapter.
Secondly, concepts that were attributed to customer-centric ECIS emerged after reflecting on aspects of the interviews in which business processes were discussed. A large number of informants discussed the success of ECIS by alluding to the customer. Informants were particularly concerned with the impact of back-end ECIS processes on the customer. The ambit of the discussions extended beyond the web-interface and included several issues relating to the development and deployment of back-end ECIS.

5.3.2 ECIS development

ECIS that are regarded as customer-centric would require that both internal business users as well as external users, viz., customers, are incorporated as important stakeholders during systems development. The role of both internal and external users is especially important during systems planning and analysis phases, as well as during systems design (e.g., prototyping) and implementation (e.g., user acceptance testing). When this theme first emerged, I probed the evidence in more depth to establish the extent to which informants were attentive to CC imperatives. The content analysis suggested that IS managers did not make as many direct references to CC as compared with business managers. This implies that the IS stakeholders were not attuned to CC as their business counterparts. Of the 22 interviews with IS stakeholders, evidence in only two instances stressed the importance of CC during ECIS planning and development. The following excerpt illustrates the problem faced by IS teams in this regard:

“Satisfaction of the user is a key component to our development – but it is difficult when the client base is very broad, and especially when there is no analysis done of the target market... they’ve [referring to their e-Commerce client] got a team with different business stakeholders such as marketing, management etc., and everybody has got a slightly different idea of what end-users’ needs are” (Ormandy, 2003).
On the other hand, there were several examples which demonstrated that business managers were alert to the requirement of CC during ECIS development:

“So it’s not us going along and saying [to the IT department] that we’re going to do this without asking the customer, the customer has to be consulted because if they’re not, they are not going to be the ones buying into it” (Cruywagen, 2004).

“That’s where we’ve been very successful in that we’ve used the customers’ perceptions of the website to put together a really efficient booking – it’s all about the customer” (Van der Merwe, 2004).

“So we just tried to build a facility where the up-sell technology is extended. So when you order flowers you now get a range of products that are on sale and it will be delivered with your flowers. Now how can we do that? If we can’t build the technology that the customers require, we’re losing revenue” (Bothma, 2005).

The foregoing is indicative of a mismatch between views of IS and business stakeholders, and is a cause of concern. The implementation of strategies to foster a closer alignment between these stakeholders is one approach that could resolve this. This is discussed further in Finding Two.

5.3.3 The Database Management System (DBMS)

The DBMS was identified as the system that had the most impact on customers, when compared with other back-end systems. Therefore, e-Commerce businesses that designed the database with CC in mind were in a better position to service the high expectations of their clients.

In the following examples, informants described how they responded to customer queries by profiling customers based on their prior purchasing histories:

“If I have a query from a client, I need to know: Is this guy new? Has he bought from us before? What wine does he drink (red or white)? What sort of price range does he buy and so on? Does this customer buy on rating, or does he buy on price? You know I need all types of information down to almost what his dog is called!! So I need that information before I go back to the guy. And so it makes a huge impact on someone when they get a response that exceeds his expectations, because you found out more about him, than he told you in that particular email.
So when we get a query, we know if a guy has ever bought from us before, and we know what his preferences are. So he might have just sent a general enquiry say enquiring about auction prices and we get back to him with very specific information geared to his needs as determined by his historical data with us. Now this blows a customer’s mind away as opposed to getting an automated email” (Paulse, 2004).

We designed the database so that it produces the information we need to understand our customers – so then we are in tune with their needs and we are able to service them more effectively. So the database structure was informed by this need to have a customer profile accessible so that the moment we had a query we knew his profile, and could give him service tailored towards his profile (Hammond, 2004).

The examples above show how CC could be promoted by forethought during the planning of the logical design or database schema. When data structures are ill-conceived, the business could be hampered in their quest to be customer-centric.

A second DBMS-related problem that was common, concerned the quality of data, sourced from third parties. This was a particular challenge as many of the businesses alluded to the incompatibility of product data from third-party suppliers. The uploading of data was fraught with problems, and as a result customers were provided with incorrect information on the website. Furthermore, erroneous data resulted in delayed deliveries owing to the non-availability of the stock item, or worse still, cancellations of purchases. The manager of an online digital accessory store underscored the importance of accurate data related to CC:

“...when you’re online you don’t have the options to touch and feel what you’re looking to buy. We therefore have to make sure that the consumer confidence is high when it comes to deciding what to buy from us with what we offer. So if we put up a product, e.g., a digital camera – people love to play with digital cameras – they want to know the size, they want to know the weight, they want to know the colour. So we’ve got to make sure the picture we put up there came out absolutely correct. So we source that picture direct from the manufacturer by product code because that product is unique, and then the same with information, we’ve got to make sure that all the information is correct and accurate...” (Meyer, 2005).

Thus the quality of the data has ramifications on customers’ perceptions of service. For example, a customer who receives an item that isn’t
100% the same as the description on the website, or is told that the item he ordered is not in stock, or can only be delivered in twenty days instead of the promised five days, is likely to form a negative perception of service quality. It is thus probable that that customer will choose to do business elsewhere, and therefore rampant problems of this nature will result eventually in a poor image of service, and consequently a decline in sales.

5.3.4 Fulfilment

The ECIS that support order-fulfilment were also found to be an important CC issue. In particular the interface between the e-Commerce business’s order processing systems, and those of their delivery agents, affected the organisation’s ability to service their customers. A well-designed system would ensure that relevant data such as order details and the delivery address are accurate. The next hurdle is for this data to be both timeously and accurately conveyed to the delivery agent’s system. As the following interview excerpt demonstrates, simple errors could have potentially devastating effects on customer service:

“...the KMS [referring to their custom-built order processing system] is also utilised as the delivery mechanism. This feeds data into the distribution centre where they will do the picking and packing and delivery. Again 100%, no margin for error! If you pick [product items] wrongly [sic] we’ve got a problem: the customer won’t get what she ordered and that can be quite dramatic. Although the values may be small you can imagine it can easily happen you can send an adult movie to a person who for instance is a priest!” (De Goede, 2004).

5.3.5 Management reports

There are various types of standardised management reports that are equally important to an e-Commerce business as compared with any other brick and mortar business, e.g., sales reports, invoice summaries, supplier reports, etc. However, many managers that were interviewed stressed that they needed more than standardised reports. One informant, for example, alluded to the fact that they had access to lots of
information, but this was not useful as it only provided a “one dimensional” view (Meyer, 2005).

There are certain e-Commerce business functions in which reports become a critical success issue. Managers are seeking ways in which ECIS can provide them with “business intelligence” (De Goede, 2004; Harris, 2005) that would support business decision-making insofar as one-to-one marketing is required.6 A successful e-Commerce business takes into account the personalised interaction expected by customers. E-Commerce managers are therefore expected to be cognisant of this. The implementation of systems that provide management reports,7 are therefore important in supporting CC. The following example illustrates this:

“…and the one thing that we are not doing effectively is classical one-to-one marketing. In this approach the customers expect you to learn every interaction that you have with them. It should be a learning experience for us as an organisation and they [the customer] want to see that reflected. But because we are looking at reports, and because we don’t have really robust business intelligence, we are not truly learning each time we interact with a customer in a way that we can push a newsletter out that is more targeted to that person…” (Harris, 2005).

The reliance on ECIS to provide business intelligence therefore underscores the importance of both management and executive IS in ensuring CC.

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5 The term “business intelligence” was used by these informants to describe the outputs of management reports that support business decision-making.

6 One-to-one marketing is an approach that concentrates on providing services or products to one customer at a time by identifying and then meeting their individual needs. The term was first introduced into the literature by Peppers et al. (1999) in Harvard Business Review, and was subsequently discussed more substantively by Godin (1999).

7 Most modern DBMS have the functionality to provide such reports, by manipulating the data through programmed instructions. Online analytical processing (OLAP) tools are also another useful means to harvest customer data for management reports.
5.3.6  The website

The web-interface represents the main point of interaction between the e-Commerce business, their customers and the outside world. As such it has an important role in supporting CC. Website-related terms were frequently mentioned by informants. However, informants did not engage in detailed discussions around website design, preferring to deal with this issue in brief only. I reflected on the lack of depth of the discussions on this component of ECIS and concluded that the reason for this is that the website itself is a mature technology, and therefore was already well understood by the informants. Thus the brevity of discussions concerning the website did not imply that this ECIS component was unimportant to informants. The website concepts which were highlighted by informants most frequently, and which support the CC theme, were ease-of-use and user-friendliness, as indicated in the following excerpts:

“...there is also the user friendliness aspect. To get to any one wine, there is [sic] probably about six or seven routes to get there, because people don’t think alike, people have different logic patterns, people come in with a different frame of reference... and therefore, I think the user-friendliness of the site is imperative” (Paulse, 2004).

“I want to ensure that it is convenient to go and shop online. I make it extremely easy. I suggest that my service is what makes me different and the feedback that I’ve got is exactly that. You know people are very happy that it’s really easy and convenient to shop on my website; they love the experience, and they enjoy it ...” (Wannenburg, 2005).

Another important aspect of the website that was identified as being critical to CC was the search engine, as explained by the following informant:

“Okay, I think one critical area is that you have got to have a really top notch search engine. The search facility has got to be one of your major drivers ... if that’s running slickly and if you doing best of breed – then you’re in the pound seat. When you’re dealing with over a million products – the customer has to easily find what he or she is looking for in the shortest possible time ... or else you will frustrate him” (Harris, 2005).

Lastly, the other aspects of the website that informants attributed to CC, included information quality, branding, trust and speed.
5.3.7 Summary of Finding One

Figure 5.3 is a representation of the generic ECIS configuration presented in Section 5.2 above. The symbols 1 through to 6 in the diagram are used to highlight six critical areas of ECIS that impact on CC. (Note that the discussion that follows, uses the same symbols to reference the diagram.)

Figure 5.3: Critical areas of ECIS (numbered 1 to 6) that impact on CC

1 The web-interface is the customer’s first point of contact with the business and as such it will have the most impact on CC. This is well recognised in the current literature, with substantive research having been conducted into website design, usability of websites, and electronic service quality. However this study has found that CC extends beyond
the website. Thus those aspects of the ECIS identified in points 2 to 5 below, are equally important in ensuring CC.

2 The database is a critical component of ECIS. Its centrality to other components of the ECIS infrastructure (such as Business Intelligence and Order Management Systems) implies that next to the website, its design warrants careful thought as to how CC can be facilitated.

3 The interface between the e-Commerce business and third party suppliers is an important aspect of the ECIS infrastructure that has a bearing on CC. The ability of the business to receive product data quickly and efficiently from its suppliers influences the accuracy and relevancy of catalogue data in the DBMS. This in turn impacts negatively on the customer who, for example, could receive inaccurate information regarding the availability of an item or even the specifications of an item being purchased.

4 The order management system is responsible for receiving and processing the customer’s order. If the order is not processed in a timeous manner, or if inaccurate details regarding the order are processed, then the business is ultimately faced with a dissatisfied customer.

5 The logistics management system facilitates the final fulfilment of the order. If there are problems with the processing of information in the order-management system, deliveries are either delayed, or the wrong products could be delivered to the customer.

6 The management reports produced by business intelligence systems enable managers to analyse the profile of customers, and to make decisions that positively impact on the needs of customers, thus increasing loyalty and return sales. Based on information contained in
these reports, managers are able to make sound decisions regarding the effective deployment of IS resources, system enhancements, and the initiation of new IS projects.

In summary, this finding has focused the need for ECIS to be customer-centric in the way in which they are designed, deployed and managed. Customer-centric ECIS are therefore of critical importance to the success of the e-Commerce business. There are two important management issues that impact on the ability of the business to deliver this. These are the harmonisation of business and IS mindsets, and the agility with which ECIS are managed (refer to finding Two).

Finally, the importance of customer-centricity needs to be qualified. CC in general, is a key issue especially for businesses that are located in a market in which there is a high degree of competition. Those businesses that have clearly formulated strategies in place to ensure that they meet or exceed their customers’ expectations are those who would usually capture sufficient market share to remain profitable.

In the e-Commerce domain, due to the pervasive nature of the web, CC has become even more important since customers who are dissatisfied are able switch to another online company more easily if they are dissatisfied. Colby and Parasuraman, for example, argue strongly that those businesses “who truly understand the desires and concerns of the growing base of e-customers will be the winners in this new era” (Colby & Parasuraman, 2003:28). Thus the role of ECIS in facilitating the retention of customers is considerably more important than in brick and mortar businesses. There are however exceptions to this as it may be possible in certain instances for an e-Commerce business to have low levels of CC and yet still be profitable. For example if a business does

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8 In brick and mortar environments customers were constrained by geographical locations of the business.
not have any competitors, its customers’ options are confined.\textsuperscript{9} Thus even the most uncaring companies could succeed if there is a sufficient demand for their product or service. In such cases, customers who have a need for a certain product will transact online with the company regardless of their perceptions of how well ECIS are used to meet their expectations of quality service.

\textit{Finding Two/...}

\textsuperscript{9} In South Africa, the online wine retailer \textit{Cybercellar} is one such example.
5.4 FINDING TWO: Harmonisation of business and IS mindsets

The e-Commerce environment requires a deeper intimacy between the IS function and business management. The traditional tensions normally experienced between these two groups need to be eliminated so as to foster a greater congruence of IS and business-thinking. This is referred to as the harmonisation of business and IS mindsets.

5.4.1 Introduction to Finding Two

Finding One highlighted the importance of CC in the e-Commerce environment. This suggests that a new attitude on the part of business managers to IS, as well as that of IS managers to business, is required. The demands placed on ECIS to achieve CC imply that IS and business-thinking need to be harmonised in a more fundamental way than has been required in the brick and mortar environment. The term harmonisation as opposed to alignment, more appropriately describes the relationship that is required to prevail between business and the IS function. This finding inspects the crucial issues pertaining to this relationship and how these impact on the success of ECIS. It examines how the congruence of IS and business-thinking strengthens the organisation’s ability to successfully implement a customer-centric business model. Finding Two therefore builds directly on Finding One and leads to the conclusion that a deeper harmonisation of business and IS stakeholders is required in the e-Commerce environment.

Several of the themes identified during the analysis were adapted or changed, or regrouped, as the body of evidence grew larger. A category named Business & IS relationship was identified during the

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10 The literature currently refers to the alignment of IT and business, e.g., Henderson & Venkatraman (1993); Luftman (2003); Coughlan et al. (2005).
early analysis phases. At the point of theoretical saturation, this was one of the categories that had not been renamed or changed. This is indicative of the importance of this theme to the research questions. One of the underlying motives behind this finding was the different perspective of ECIS that emanated from the two groups of informants, viz., business and IS stakeholders. The following two excerpts emphasise this:

“The other thing that I think from an IT perspective is that we are not technical people ... um ...[sic] we’ll sit down and – well you know we are great at blowing up balloons and drawing pictures – that’s what Marketing is all about. What we’re not good at is that we don’t understand what happens behind the scenes and sometimes maybe it’s important that we do but that’s not what we are employed to do. So it’s critical for the IT people to understand that they’re there as a support. So if something does go wrong, or something that we don’t understand, then we’re not just stupid dumb users! We’re actually there to try to create a benefit for whoever that may be – whether it be for the staff or whether it be for our customers” (Cruywagen, 2004).

“So we’ve learnt from experience that most technology people, most software developers, are not business people. Equally business people are not software people. So we can’t say: ‘Look we want a site that kind of sells flowers and does this and that, and just make it happen’, because they’re going build it in a way that might not be consistent with our business practice – so we have to be very, very specific” (Bothma, 2005).

These two examples bring to the fore the divisions that exist between IS and business managers, and hence the underlying rationale for this finding. Table 5.1 presents a summary of the sub-categories that were coded along the axis of the Business & IS relationship category.
5.4.2 The business’s responsibility for ECIS

The evidence suggests that the successful implementation of customer-centric processes is achieved through a joint effort of both business and IS stakeholders. Moreover, there was evidence of success when business managers, rather than their IS counterparts, assumed overall responsibility for ECIS. The informants in the following excerpts emphasised the role of business managers:

“It’s important for us that ownerships rest on the business, not on an independent external party nor the vendor [of ECIS]. They are there to provide a service and expertise, be it technical expertise, or process expertise, or change-management expertise, but they will never take ownership of a project and hence will never make decisions on behalf of the client. They will make recommendations on what is the best thing to do” (Mitchell, 2004).

“My line responsibility is IT. Having said that, the mechanism that we have in place is still not one, where even though I really understand the business pretty intimately, I still don’t as an IT person take responsibility for priorities. Priorities are determined 100% by the business side by the commercial team” (Schreider, 2004).
However, contrary to the above, there were business managers who believed that the ECIS domain was not one in which they should interfere. Sometimes this was as a result of a feeling of inadequacy as they felt that they did not have the necessary skills. One informant described this situation as follows:

"And senior management usually won’t have a good grasp of what is involved in e-Commerce systems and they quite often leave it to the IT guys – which is wrong. As you know this is not a thing [e-Commerce] we should to be seeing as an IT- driven initiative. IT plays a large part of it but the business itself has to drive it" (Marshall, 2004).

It is important therefore, that an e-Commerce business manager has an understanding of ECIS, so that he is able to make meaningful and insightful decisions. Managers who have oriented themselves to ECIS will also benefit in that they would be able to interact with IS personnel from a more informed perspective, rather than one of ignorance. The following interview excerpt demonstrates a situation in which a manager had to rely on the IS function:

CA: ... but I’m personally not a developer so I can’t comment on the code.
SP: Do you think that’s important in your job – to be able to comment on the code?
CA: I don’t think so, I look at it more from a business perspective you know. I leave the technical issues up to people who are qualified – because of the past relationship we have experienced – we don’t have to question what’s going on you know and obviously if there are any problems I’ll just call in one of the guys from IT just to check that everything’s fine and they’ll just have a look at it and say it’s ok. (Azeem, 2005).

By quoting the above, it is not my intention to imply that e-Commerce managers need to be technically literate on all aspects of the ECIS such as the programming code. Rather, as a minimum, the manager is required to be conversant with at least the basics of the ECIS. Of all the businesses encountered in this study, those that claimed to be successful had managers who had a firm understanding of ECIS, and who were in a position to confidently engage with IS personnel. One informant who had broad experience in several e-Commerce projects,
highlighted the repercussions of delegating the responsibility to IS functionaries:

_This [referring to the e-Commerce business] cannot just become an IT thing – if it does it will fail. Coz [sic] IT will only look at the technicalities that’s involved and that’s all they will worry about. They [IT personnel] won’t worry about business issues, about the business processes that perhaps need to be modified or changed before they’re implemented or they might not have certain processes in place. We put a lot of emphasis on trying to make the business understand that they have to acknowledge this and they have to be responsible for it (Marshall, 2004)._ 

### 5.4.3 Strategies for promoting harmony between business & IS teams

In organisations in which there was limited collaboration between business and IS stakeholders, each of these groupings viewed each other with some disdain. The two examples below demonstrate this. The first is a software developer’s view, and the second, a business manager’s:

_“The problem depends on management style and leadership in the organisation. If a client is open-minded about his business and acknowledges his lack of Internet-related knowledge, and is willing to commit to working jointly with us – then we can achieve quite a lot. But we’ve often got clients that are convinced that actually they are the designers themselves even though they’ve got very little knowledge of the Internet. That is very often a problem. That is dangerous!!! Managers should understand how important the e-Business solution is to achieve financial gains – and if they don’t they should rely on somebody else’s input and accept it” (Ormandy, 2003)._ 

_“Because the designers of the websites are often not involved enough in the actual business, they perceive what they think should be on the Web. And so they go and they spend a lot of time – which costs the company a lot of money – to put up things on the website that look good. Perhaps it works perfectly and does all the right things, but if you actually look deeper, you find that those pages are visited by very few people” (Niewoudt, 2004)._ 

The above is typical of situations in which there is minimal collaboration between the business and IS function. Even in instances where a business has outsourced its IS, it is incumbent on business management to create the means and opportunities to jointly tackle both the daily as well as the strategic challenges posed by the ECIS.
The best example of a successful relationship between the IS function and business stakeholders was that of the leading South African e-Tailer, ShopperSA.\textsuperscript{11} When ShopperSA initially commenced operations in 1998, the relationship between business managers and the then embryonic IS department was at low ebb. In the initial period of their operations, the ECIS were plagued by serious problems such as bugs and inadequate performance. Because of the rush to be in business, the initial attitude of business managers was “Get something going, get it on the Web” (De Goede, 2004), without due consideration of the implications of their requests. This is clearly an unsatisfactory approach to any business project and perhaps especially an IS project. However, in this instance the IS function responded as best as it could by trying to implement these requests without fully understanding what was really required. This led to unsatisfactory systems, which in turn resulted in distrust between the two parties and eventually a substantial breakdown in communication. Thus, after an initially poor start to the business in which the website was actually shut down, the management made an all-out effort to reconstitute the way in which they approached their relationship with the IS function. In the words of the Chief Operations Officer:

\textit{“We then introduced methods of operations within IT whereby business takes responsibility for IT. The outsourcing IT partner will take accountability but business will take responsibility”}\textsuperscript{12} (De Goede, 2004).

\textsuperscript{11} i. Note that names of businesses have been changed in terms of the confidentiality agreement with informants.

ii. Although IS-Business harmonisation concepts were also identified in the evidence collected from various other businesses, I have chosen to explain this finding through this particular business, since it best represented all of the concepts associated with Business-IS harmonisation.

\textsuperscript{12} There are different views about the meaning of accountability and responsibility, and these terms could be used synonymously. Having reflected on this interview transcript, what this informant is implying is that the IS (or IT) partner will oversee IS operations, but eventual responsibility for the actions of the IS functionaries rests with the business manager.
ShopperSA successfully harmonised the business and the IS function using a three-pronged strategy:

- Firstly a weekly business-prioritising meeting was institutionalised. A task team of business stakeholders (see Figure 5.4) meets weekly with IS managers and does short- and medium-term prioritising. Criteria that guide prioritising of IS tasks are linked to business rules, e.g., tasks that directly affect keeping the business open are at the top of the list, followed by tasks that directly affect turnover and profit, followed by non-urgent system enhancements.

The result of these team meetings led to two benefits, the first of which led to smoother decision-making regarding prioritisation of IS tasks. Business stakeholders now understand the role and functions of the IS department across all sectors of the business, instead of from a narrow line-function focus in which they only had a view of their own section’s needs. The result of this was that different
business managers developed a mutual understanding of each other’s needs. It was therefore easier to reallocate resources when critically urgent tasks arose. The second benefit was that IS stakeholders began to understand what was in business managers’ minds, and how they thought about business. This helped to remove the distrust that existed previously between the two parties, and IS personnel were able to perform their tasks from within a business context as opposed to an IS only contextualisation of task accomplishment.

- The second IS-Business harmonisation strategy adopted by ShopperSA involved the institutionalisation of more formal systems development methodologies called RUP. The value of having a methodology in place was that it introduced formal processes that produced project documentation that was meaningful to both IS and business stakeholders. In this way all the role-players were able to participate in systems development phases with confidence. As a result of the implementation of this new methodology, business stakeholders became fully involved in all phases of the systems development life cycle.
- The third strategy involved getting key IS team members involved in decision-making at all levels. As a result, IS stakeholders were involved in making decisions from the moment a new project was mooted by a business manager. Furthermore, they were also involved in routine business meetings at which issues such as gross profit, budgets, turnover, etc., were discussed.

5.4.4 Summary of Finding Two

In the e-Commerce environment it is incumbent on the business management to take responsibility for the management of ECIS as opposed to devolving this responsibility in total to the IS function. The
management of ECIS should be viewed as a business responsibility and not that of the IS function, whether it is based in-house or outsourced. This implies that e-Commerce business managers are required to influence and direct the IS function through a joint discourse which should take place within a participative decision-making structure. Thus successful ECIS is driven jointly by both business and IS stakeholders through carefully structured team meetings. IS managers also need to be included in business decision-making. In a joint decision-making environment the management of ECIS is driven by a collective mindset, which simultaneously takes into account business priorities as well as ECIS challenges. Lastly, harmonisation can be achieved by ensuring that business and IS stakeholders are involved in all phases of the IS life cycle.

Finding Three /…

13 RUP® is a comprehensive, web-enabled set of software engineering best practices that provide guidance for streamlining the team's activities (Kroll, 2001).
5.5 FINDING THREE: Agility of the IS function

The constantly evolving environment in which e-Commerce businesses exist requires a special degree of agility from the business and the IS function. Systems and processes that are rigid do not allow the organisation to easily adapt to this dynamic environment, therefore constraining the business’s ability to maintain a competitive edge. Agility requires innovative IS management practices to ensure the continuous ability of ECIS to support customer-centricity. Agility is therefore an important strategy that enables the business to be responsive to its customers’ needs and to remain one step ahead of its competitors.

5.5.1 Introduction to Finding Three

The word “agile” may be used in at least two different ways. “Agile” refers to being nimble, or being able to move quickly with suppleness, skill, and control. Agile also refers to the ability to be mentally quick and to be able to think swiftly and intelligently. From an IS perspective agility refers to the ability to respond and adapt to changing business conditions both within and outside the organisation.

Agility is important to e-Commerce businesses as they are under pressure to be more responsive to the changing business environment as well as the high demands of their customers. Therefore business managers and the IS function, in using a harmonised approach, have to be agile and innovative in the way in which they respond to change. The many references in the evidence that pinpointed the need for agility ranged from the evolving nature of the business environment, e.g.,

“This environment is like an evolution … today you might think something works and suddenly a month from now you realise that it doesn’t work and you have to react and change it” (Pike, 2005);
“...so it’s all about turnaround time, it’s all about being like literally on the ball, real time as soon as it happens you’ve got to act and that’s the difference in this [e-Commerce] business” (Meyer, 2005);

to the competitive nature of the e-Commerce environment, e.g.,

“In a small market your information is so critical because you’re fighting to grow; you’re spending money; there’s the GP [gross profit] that you have to play with the whole time to get the mix through the door, and one is affected by all this. In the South African situation all of this is made more complex when someone else like Exclusive Books or a Musica or a CNA suddenly starts doing a particular promotion. The customers are not loyal. They’ll switch brands like anything where the price is right. Therefore you can be affected by the market today and you’ll need to react to keep your customers” (Harris, 2005);

and to the need to offer new products on the website as quickly as possible, e.g.,

“We cannot wait for three weeks before it goes on the site. It’s got to go on immediately and they’ve [referring to marketing personnel] got to have that flexibility, and agility to do that” (De Goede, 2004).

A number of IS management practices that are considered to improve agility were identified, viz., the ability to manage the website content; the way in which critical system errors are responded to; and the prioritisation of day-to-day ECIS tasks.

5.5.2 Manipulation of the electronic shop-front in response to changing conditions

The e-Commerce business world is highly competitive, especially since customers have a number of alternatives from which to choose the best online offering. The informants of this study, who were wary of this, articulated that they relied on ECIS to meet the demands of these competitive forces. One important aspect of this entailed the ability of the business to easily manage the website content, e.g., to be able to offer a special discount at short notice, or to add or remove new products to the website as soon as a deal was negotiated with suppliers, without incurring costs in terms of time and money.
Managers of businesses, especially those who did not have in-house ECIS support, therefore emphasised the benefit of business users being able to manage website content, independent of any intervention by IS personnel. They were of the view that any dependency on the IS function to carry out these routine tasks would reduce the business’s agility. This appeared to be especially important to businesses that were operating in the virtual transaction space. As one informant explained, it is about getting products as quickly as possible onto the website:

“Agility for business is extremely important. We get calls from potential suppliers every day. People saying that they’ve got products that they want to put on the site. Or a representative of Ster Kinekor will come in and say: ‘We got a Shrek [referring to a movie] special that we want to offer immediately’. We cannot wait for three weeks before it goes on the site. It’s got to go on immediately and the marketing department has to have that flexibility, and agility to do that … it’s extremely important for them. It’s like the shop. The moment you got the product, it has to get onto the shelf as quick [sic] as possible … you’ve got to be very quick in changing things on the site. Now it’s extremely important that IT supports the marketing well with templates and abilities to do those changes” (De Goede, 2004).

A key requirement in this regard is that systems, such as the database and web-content management systems, should provide business users with the functionality to update the website without the intervention of an IS support person. It is important therefore, that businesses procure or design systems that incorporate utilities to enable the business users to log on securely to remote servers to update the database, as well as refresh dated website content.

5.5.3 Responding to critical system problems

The informants stated that one of the foremost challenges in the e-Commerce business environment was to ensure that all components of ECIS were reliably functioning. For example, every minute during which the website is down, effectively means that the business has closed its doors to its customers. This is a reality as the nature of technology is

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14 The virtual transaction space refers to one of the four virtual-spaces in Angehrn’s ICDT Model (Angehrn, 1997).
such that it can fail at anytime of the day or night. When this happens it is in the interest of the business to respond as quickly as possible, to ensure that the site is up and running in the least possible time. Some business managers who had service-level agreements in place with their IS providers, relied on the spirit of these agreements for a prompt response. However, as pointed out in Finding Two, the IS function should be accountable to management when critical system failures occur. Thus the business manager has to ensure that he is in a position to influence the course of corrective action when systems fail. For example, one manager receives an automatically generated SMS on his cell-phone when a critical system error\(^{15}\) occurs:

> “And we’ve got an application – I think it’s called a ‘cal-test’, which is a automatic checker against all these things [system errors]. This will send you an SMS saying the system is down. Basically this thing is testing all the systems constantly every few minutes. What really happens is that it sends an order every two minutes to the bank for approval. And it just runs to see whether: one, if the site is open; two, does it go through to the bank; and three, do you get a response back?” (De Goede, 2004).

Thus a business can be considered to be agile when its managers operate as though they are doctors on 24-hour call. One informant, who managed the business in this way, took agility one step further. In addition to getting an automated SMS, he slept with his cell phone on, and had created a remote facility for him to reboot the server from his home. He did not rely on support from the IS function to respond to a critical system problem, preferring to take charge of the situation:

> “The system is being constantly tested for uptime, 24 hours and 7 days a week. Basically there are two guys who always have their cell phones on. As for me, I’ve got to know what the bigger problems are. If it’s a code disruption on the website – and it’s very seldom that happens cause the code doesn’t just change – I’m not going to know until I get in, in the morning, because I’m not going to start editing code. But if the site goes down I can see that immediately on my cell-phone. If at 3 in the morning I get an SMS – I sleep with my phone on as well – I have the ability from my house to reboot the server so I can do that; I don’t need to phone our technology guys” (Bothma, 2005).

\(^{15}\) An error which causes the website to become unavailable.
It is also possible to promote agility by innovatively structuring ECIS. For example, this informant describes how his organisation's agility was improved by the use a redundant database:

“We actually have three databases, with two based at our ISP. What we do is our local server and one of the SQL servers at our ISP, replicate with each other every ten minutes. Therefore our customers are seeing a live environment as well as our call centre, which transmits data over a dedicated line between the two servers every ten minutes. Why we do that is because it gives us a certain amount of redundancy. It means that if our website is ever down we can quickly put up a page that says our call centre is open and we can take orders and we’ll be back up in five minutes. Equally if something happened at the call centre, the call centre agents can access the live site and do what they need to do there. However, replication is quite resource-intensive” (Bothma, 2005).

In the event of critical systems failure, agility is also dependent on availability of human resources. For example, a national online airline has a team of three people referred to as the “rescue paramedic team” who will respond immediately to IS problems:

“We have a support team, called our rescue paramedic team, in place specifically for this business server environment and the systems environment. So what happens is we’ve got a specific designated individual in the call centre that actually coordinates feedback from calls that are received in the call centre. So he would raise issues that are there that’s on the call centre side. He would then pass that on to the person that’s responsible for – there’s a team of three people that looks after that our systems – specifically the reservation system – and they would take that feedback and then go and look in the system and try and understand what caused the problem that the user experienced” (Schreider, 2004).

However, not all businesses could afford to have in-house IS expertise at hand to deal with urgent issues. A number of smaller businesses relied on an outsourced IS function for support. Consequently, another key issue that affects agility is the service level agreements that are in place between the two parties. Many small businesses underestimate the impact on their service as a consequence of a long turn-around time from an outsourced IS provider who may have priorities with other clients at the point of crisis. The excerpt below, taken from an interview with the manager of an outsourced e-Commerce software provider, demonstrates this:

“They [referring to e-Commerce business clients] expect a lot of you – that’s what I think. Or they expect more than they pay you. Now you’ve got to be firm about it. I say ‘Yes I can do it for you, but I won’t able to start it until three weeks’
time’. And that often annoys clients, but I think it’s because they don’t understand that they’re not my only client” (Ziqu, 2005).

Alternatively, if a business cannot sustain the financial impact of having a permanent maintenance contract with the outsourced IS provider, it would have to ensure that, as part of its contingency plans to cater for urgent IS problems, there are funds available to pay its outsourced IS provider when an immediate response is required. This emergency special fund is one of the factors that would facilitate agility. As explained by one informant who is an outsourced IS developer, they charge a special fee if work has to be done urgently without a contract:

“Sometimes there are cases when where a client needs something done immediately. Basically for that we do charge – there is a special fee, which we charge just to do it immediately – which the client is forced to accept because obviously from their business point of view the change is necessary and it’s needed to be done immediately” (Ziervogel, 2005).

5.5.4 Prioritisation of IS tasks

The way in which IS tasks are prioritised impacts on the organisation’s agility, especially when critical system errors occur. This does not imply crisis management, but rather stresses the need for an organised approach in which routine tasks are reprioritised to accommodate urgent ones. The complication increases in bigger businesses, where there could be a number of projects being worked on at the same time. One business used a software package to enhance its agility in task management. The manager of this business described how this works:

“We’ve got a system here that we call ‘Clear Quest’… it’s quite an elaborate management tool for IT. All users have access to Clear Quest, which they use to log all issues and problems. They log the date, time and exactly what the problem is, as well as a priority code. What we’ve got is one of our project managers will at every interval – not every day but every hour or two – will work through the Clear Quest logging system. So in terms of the day-to-day operation, where the things are cooking and steaming, users log onto Clear Quest, and the tasks will then get prioritised immediately. All the code 9s [highest priority] will then get flagged immediately – and then we’ll get the team leaders in immediately and we’ll discuss how we will respond. The other lower priority codes will go to the weekly BPT [Business Planning Team] and we will all prioritise it there” (De Goede, 2004).
The harmonisation of business and the IS function also impacts on agility in a situation such as that described above. The value of having a joint IS and business meeting to discuss the prioritisation of system critical tasks is obvious. The less complicated the decision-making structures are in the business, the easier it is to make quick and speedy responses to urgent IS situations. Businesses with flatter structures are more agile in decision-making. The following two excerpts underscore this point:

“If you are involved in a corporate set-up, the people in the backend get frustrated because they see the mistake. But to get it fixed you have to go to meetings, and planning commissions, and it takes a while until something gets done. Here if we see a mistake today, this afternoon it’s fixed. It’s less stress on a person” (Pothier, 2004).

“And that’s one of the advantages of being such a small company with a small core team – being a small team also helps in that we can be incredibly flexible and if we need to change something today we can. So it’s that sort of immediate response time that I like about having most of our IT systems in-house” (Paulse, 2004).

Agility requires a multi-skilled IS team. The IS function cannot be agile in the way it responds to critical problems, if it does not have the skills available to attend to the particular problem. The following excerpt describes the strategy used by an IS manager to encourage a multi-skilled team:

“We spend a lot of time mentoring the IT staff. So, for example, when we implement control procedures – like checking someone’s code – it doesn’t just end by saying ‘No, that’s not right, go back’. We always try to identify somebody whose skills you can increase, and get that person involved in the process. We find that when our whole team works in a unified way, it makes it so much easier for guys to be redeployed to areas of need. If this is successful, then the turnaround time on fixing urgent problems would be so much far [sic] up there” (Oosthuizen, 2005).

The benefit of encouraging staff to diversify their area of expertise is therefore supportive of agility. Thus, when an urgent, critical problem arises, the IS manager has the flexibility to redistribute expertise to the area of need.
5.5.5 Summary of Finding Three

The following have been found to impact on the agility of the e-Commerce business:

- Being able to keep the content of the website accurately updated in the shortest possible time, with the least effort.
- Responding to critical systems problems both quickly and efficiently.
- Having innovative back-up systems such as redundant databases.
- Making decisions regarding the prioritising of IS tasks and the allocation of personnel to that task quickly and efficiently.

An e-Commerce business could be agile from two perspectives. Firstly, agility implies that a business, through environmental scanning and analysis is able to recognise and rapidly respond to new business opportunities. Secondly, agility from an IS management perspective implies that the business uses flexible operational structures and methods so that its systems are readily responsive to the changing environment. This finding, which focused on the latter, has proposed strategies to enhance the agility with which ECIS are managed. Thus the ability of the organisation to deliver speedily in terms of the value disciplines\textsuperscript{16} is enhanced. Lastly, the e-Commerce business can only be agile if it has the necessary processes in place to monitor and evaluate its IS on a continuous basis. This is discussed further in Finding Five.

\textit{Finding Four /...}

\textsuperscript{16} Treacy and Wiersema (1993:84) describe the value disciplines as being related to operational excellence, customer intimacy and product leadership.
5.6 FINDING FOUR: Managing ECIS quality: key aspects of functionality

There is a high degree of reliance on ECIS. As such, ECIS functionality is of elevated importance in the e-Commerce business environment. A more comprehensive view of ECIS quality is required, given that effective back-end systems are as vital as a well-designed website. As customers become familiar with e-Commerce, the demands on ECIS increase. Effective e-Commerce businesses need to be able to keep up with and preferably exceed these expectations by managing the quality of key areas of ECIS functionality.

5.6.1 Introduction to Finding Four

The quality of ECIS either directly or indirectly influences the customers’ perceptions of the business. Managers are therefore compelled to take an active interest in the management of ECIS quality, by paying special attention to key areas of ECIS functionality.

The results of the content analysis in Table 5.2 show that the ECIS Functionality category contained the highest number of coding instances. An introspection of the evidence in this category indicates that informants discussed ECIS functionality mainly by reference to pleasing the customer, and the implementation of business processes. This suggests that managers’ views of system quality were through a business lens, and not a technical IT perspective.

This finding firstly highlights the reliance of e-Commerce businesses on ECIS, after which those aspects of ECIS Functionality that were identified as problems by informants are discussed.
5.6.2 High reliance on ECIS

The dependency on ECIS implies that the quality of systems is a critical factor underpinning success. As one manager put it,

“We’re a company that relies on technology and we need our technology and the people behind the technology to be the best” (Meyer, 2005).

The businesses that participated in this study operated in all of the four virtual spaces of the ICDT model (Angehrn, 1997), viz., the information, communication, distribution and transaction spaces. The extent to which an e-Commerce business is reliant on ECIS is dependent on its objective for having an online presence. For example, a company that uses the Web to convey information only to its customers (virtual information space) on static web pages is not as reliant on ECIS as compared with a company that uses the Web to facilitate sales and the distribution of its products (virtual transaction space). The relationship between the primary e-Commerce strategy of the business and the concomitant reliance on ECIS is represented in Figure 5.5 below.

![Figure 5.5: The reliance of the e-Commerce business on ECIS increases as the business extends itself from the virtual information space to the virtual transaction space](image)

Therefore the greater the reliance on ECIS, the effort at managing the functionality of ECIS should also increase. Concepts related to ECIS
functionality that were discussed by informants, were coded under a category named “ECIS Functionality”. These are presented in Table 5.2.

Table 5.2: ECIS functionality sub-categories

<table>
<thead>
<tr>
<th>ECIS FUNCTIONALITY</th>
<th>Count</th>
<th>% in this category</th>
<th>% of Total Count</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Web-interface design</strong>: content, user-friendliness, branding, personalisation, trust, look and feel.</td>
<td>68</td>
<td>24%</td>
<td>5.1%</td>
</tr>
<tr>
<td><strong>Updating Dbase</strong>: Being able to seamlessly, and effectively update the different subsets of data.</td>
<td>34</td>
<td>12%</td>
<td>2.6%</td>
</tr>
<tr>
<td><strong>Data quality</strong>: Managing data accuracy and integrity.</td>
<td>31</td>
<td>11%</td>
<td>2.3%</td>
</tr>
<tr>
<td><strong>Interfaces with 3rd party suppliers</strong>: The importance of the interface between the e-Commerce business and suppliers especially with regard to uploading the product database, and communicating product orders.</td>
<td>25</td>
<td>9%</td>
<td>1.9%</td>
</tr>
<tr>
<td><strong>IS Integration</strong>: Integrating key IS, so as to minimise the need for manual intervention right up to fulfilment stage.</td>
<td>20</td>
<td>7%</td>
<td>1.5%</td>
</tr>
<tr>
<td><strong>Remote management of Web</strong>: System’s functionality to allow business users to independently manage the website content.</td>
<td>17</td>
<td>6%</td>
<td>1.3%</td>
</tr>
<tr>
<td><strong>CRM</strong>: Use of IS to collect customer data to facilitate and maintain effective relationships with customers, including personalisation overtures.</td>
<td>14</td>
<td>5%</td>
<td>1.1%</td>
</tr>
<tr>
<td><strong>Security</strong>: Keeping the business systems secure from malicious invasions, facilities for secure payments, and protecting customer data.</td>
<td>12</td>
<td>4%</td>
<td>0.9%</td>
</tr>
<tr>
<td><strong>Fulfilment</strong>: Automated processing of orders, and seamless communication between business, suppliers and delivery agents’ systems.</td>
<td>12</td>
<td>4%</td>
<td>0.9%</td>
</tr>
<tr>
<td><strong>Evaluation data</strong>: Systems designed to provide useful data to evaluate various aspects such as website usage, sales trends, etc.</td>
<td>11</td>
<td>4%</td>
<td>0.8%</td>
</tr>
<tr>
<td><strong>Site visibility</strong>: Site designed to enhance visibility to search engines.</td>
<td>10</td>
<td>4%</td>
<td>0.8%</td>
</tr>
<tr>
<td><strong>Speed</strong>: Design of site to ensure serving of web pages in an optimal time; design of database should allow queries of data in minimal timeframe.</td>
<td>10</td>
<td>4%</td>
<td>0.8%</td>
</tr>
<tr>
<td><strong>Search Engine</strong>: Effective search engine to integrate with database to provide quick, accurate responses to customer searches for products. Search engine should facilitate the collection of data regarding search trends.</td>
<td>8</td>
<td>3%</td>
<td>0.6%</td>
</tr>
<tr>
<td><strong>Site availability</strong>: ensuring up-time of the website.</td>
<td>7</td>
<td>2%</td>
<td>0.5%</td>
</tr>
<tr>
<td><strong>Controls</strong>: Building features into systems to reduce errors.</td>
<td>4</td>
<td>1%</td>
<td>0.3%</td>
</tr>
<tr>
<td><strong>Payment gateway</strong>: Quick, efficient payment system.</td>
<td>2</td>
<td>1%</td>
<td>0.2%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>285</td>
<td>100%</td>
<td>21.4%</td>
</tr>
</tbody>
</table>
Each row in Table 5.2 encapsulates important aspects of ECIS functionality, and no one can be considered unimportant. However, those sub-categories that have posed particular challenges in managing the e-Commerce business are discussed in this finding.

5.6.3 The website

The sub-categories *speed*, *site availability*, and *site visibility* had a low content-analysis count. I reflected on the possible reasons why informants underplayed these important aspects of ECIS functionality. It is possible that as these were non-negotiable expectations of their systems, their importance was considered *a priori* by informants, and thus did not warrant detailed discussion. On the other hand, the sub-category with the highest content-analysis count relates to the *web-interface design*. Having reflected on all the concepts linked to this category, it was not possible to conclude that this implied that the web interface was *the* most important aspect of the IS infrastructure. Rather, it appeared that informants tended to refer to ECIS success from the perspective of the most visible system component, viz., the website. Another reason is that website design is a well-researched topic. Therefore informants were well versed with website design and consequently this was the one aspect of systems quality that was most frequently acknowledged. It is worth noting, however, that even though this was a highly referred to concept, the informants did not discuss the website in detail. In most cases the web-interface discussions entailed cursory references such as “*easy navigation*”, “*user-friendliness*” and “*ease of use*”.

There were, however, other key aspects of ECIS that were discussed in detail, as informants found these to be more challenging than those related to the web interface. These were:

- Database: data quality, and database maintenance (including procuring data from suppliers).
Remote website content management.
ECIS integration.

5.6.4 The database

Many informants referred to the need to improve the efficiency of their inter-organisational transacting systems. The managers of e-Commerce businesses as well as their suppliers have realised the importance of databases and the concept of data quality, especially in respect of accurate and up-to-date data. The following informant sums up the importance of the quality of the database:

“...everything starts with the data, there's not a single thing that's not, linked to the data ... If data goes down the tubes, so will the business” (De Goede, 2004).

Closely linked with the notion of data quality, are the processes involved in the procurement of product information, and stock availability data from third party suppliers. Obtaining data from suppliers emerged as a key challenge, especially since businesses kept their inventory costs to a minimum. Besides two national grocery chains, no other business kept goods in stock. Goods were either supplied directly by the supplier to the customer, or were based on a just-in-time procurement strategy. Consequently, suppliers were responsible for providing stock availability data to the e-Commerce business. However in most cases the businesses received disparate data sets from their various suppliers, and they were therefore faced with the challenge of timeously uploading the data and converting it to a format compatible with their own DBMS. In most cases this was done using email, and in a fewer cases facsimiles, since few suppliers were prepared to commit to the costs of web-based EDI or private networks. The following excerpt from an interview of an online retailer demonstrates the problem at hand:

“It may happen that some of the suppliers are not really used to providing the file or data in a computerised way. They may have it on a book or something because they are not big suppliers they don't need a computerised system. So we actually have to train them how to provide their files or their data to us ..., so we will often find that the file layout may change from day to day which means that we may
load garbage, we may load prices instead of stock and stock instead of prices or whatever, if they switch the columns – which has happened in the past. So we had to build a system to cater for those exceptions and to check the product codes and ISBN and other identifiers of products and to make sure we are not duplicating products on our side” (Du Toit, 2004).

The discussion in Finding One highlighted the challenge to provide both accurate and rich product descriptions to a potential customer who is contemplating a purchasing decision. As a result some managers instituted processes with checks and balances to ensure that the database update takes place with minimal problems, such as the case of the following business:

“There are processes which prepare the data for analysis. This is run off a staging database that is almost equivalent to the one online. And then during the middle of the night it will basically push the information through to the site, and obviously there’s some processes running on the site – and all of that is automated. It’s the responsibility of the database team, you know, to stand by and actually make sure that everything goes through, with a lot of checks and balances, SMSs flying around and lots of things like that” (Oosthuizen, 2005).

Businesses operating in the virtual transaction space, especially those which had a high volume of transactions, viewed the database with such seriousness that additional dedicated IS personnel were appointed to work just on the product data. For example:

“We have one fulltime person doing pricing and that’s just on a couple of brands, now another fulltime person will also do pricing but on other brands. Same for information. I’ve got about five or six database administrators, all they do is they search and source images, upload them, source the right information and upload it. The way I get around this is by literally micro-managing each product, and making sure that each product has better account managers” (Meyer, 2005).

The foregoing highlights two important factors that impact on data quality. The first, associated with providing accurate and updated product information, is achieved by having dedicated staff focusing on this task. This is especially important if there is no integration with supplier systems. The second involves building in both checks and evaluation procedures, so that corrective action can be taken and problems rectified when errors occur.
5.6.5 Integration of ECIS

One of the implications of Finding One, i.e., CC, is that businesses require streamlined processes to fulfil customer orders as promptly and efficiently as possible. This finding therefore underscores the need to integrate key elements of ECIS.

There were varying degrees of manual processes that were used by businesses to process customers’ orders. Manual processes were also used by some businesses to update the database with product-related data from suppliers. In the former, it appeared that businesses did have control on the extent of automation that could be implemented, whereas in the case of the latter the level of automation depended on the compatibility of data structures with those of their suppliers.

The following demonstrates the laborious and time-consuming processes involved with fulfilment in a non-integrated systems environment:

“Ok well, basically what happens is, once the order has been placed it goes onto the back-office processing system. Now what we then do is check on the availability from here, so, we’ll look at the title, the ISBN number [referring to books], we’ll check on our system if there’s stock available in the store, if it’s not available in the store, is it available from a local supplier, if it’s not available from a local supplier, is it available from an overseas supplier? Based on that we can then estimate how much time it will take to get the book down to here and delivered to a customer. We then inform the customer that it may take seven to fourteen days to deliver” (Azeem, 2005).

There were various problems that were experienced as a result of the lack of integration, such as the slowing down of fulfilment, and inaccurate information flow. This is indicated in the following excerpt:

“The information flow from e-logistics to customer servicing and ultimately to the customer, is a very manual process. And we lose a lot of time, and the accuracy of the information is affected. The guy working with it literally goes through a lot of spreadsheets... Now we’re implementing from an IT perspective something that will automate this and make it a lot slicker and cleaner (Harris, 2005).

The above points to a gap between the order management and logistics management systems. These systems are important components of
fulfilment and therefore problems that result from non-integration impact on customers' perceptions of service quality. In the following excerpt, a manager describes how a consolidated database could obviate some of the problems experienced with fulfilment:

“If you had one basic data structure – and when the customer is entering his details via the website, the data is being written to the same data structure that your order system is ordering out of as well. This implies that you would have far fewer points of failure... We’ve never had that. We always had to write little customised files for data transfers. It actually introduced a lot of problems from the front end point of view. So I think that, that would be a good success factor, i.e., a much tighter integration between the back office and the front office” (Mjekula, 2005).

There were many informants who expressed concern that the lack of integration between the database, order management, and logistics management systems negatively impacted on service quality when they experienced a sudden spurt of orders. This resulted in delayed deliveries and therefore militated against CC.

In Figure 5.6, the arrows between various ECIS components which represent information flows is indicative of the need for integration between all the components of the ECIS infrastructure. In this finding, however, four critical areas requiring integration (indicated in Figure 5.6 with the symbols 1 through to 4), which have been identified as problematic among the businesses in this study, are highlighted. They are:17

1 Integration of supplier’s and business’s database to ensure accuracy and timeous update of stock availability data.
2 Integration between the order management system and suppliers.
3 Integration of order management and logistics management systems.

17 Note that the discussion that follows, use the same symbols to reference the diagram.
Integration between the database and order management system.

Finally, reasons why businesses did not integrate ECIS were as a result of a lack of financial resources, disparately developed in-house systems, problems integrating legacy systems with newer technology, and incompatibility with third-party systems. Ideally, the e-Commerce business that cannot implement a seamless interface between the various components of the supply chain should strive to ensure that this is not at the cost of delivering poor service to the customer.

5.6.6 Summary of Finding Four

A list of 16 important ECIS functionality issues identified in this study were presented in Table 5.2. The scope of this study did not allow an
intrinsic examination of each of these, and therefore only those aspects of ECIS functionality that were most frequently discussed by the informants were examined. Notwithstanding this, the fundamental premise of this finding calls for an integrated view of ECIS quality that focuses on all elements of the ECIS infrastructure and their associated functionality. This finding demonstrates that ECIS quality is multi-faceted and impacts on a number of stakeholders, the most important being the customer.

5.7 FINDING FIVE: Continuous assessment of ECIS

Although the notion of “Internet Time” was substantively hyped, there was some element of truth in it. The 21st-century e-Commerce environment changes faster than did previous business eras. The primary impact of this is that the drivers of ECIS success described in the findings of this research may easily and quickly lose their relevance. As a result, organisations successfully employing e-Commerce need to continuously evaluate their performance continuously. Therefore, the implementation of a well-founded, coherent strategy for ECIS evaluation will improve the prospects of e-Commerce success. Both business and IS managers will therefore be afforded better insight into the strengths and weaknesses of ECIS.

5.7.1 Introduction to Finding Five

This finding illustrates that e-Commerce businesses are engaged in disparate ECIS evaluation practices. There was no evidence in this

\[\text{Internet time was a common catchphrase that originated during the late 1990s. In this period, people who worked with the Internet had come to believe that everything moved faster on the Internet, because the Internet made the dissemination of information far easier and cheaper.}\]
study of a single business with a well-coordinated ECIS evaluation strategy. Rather evaluation was based on number of varying indicators of success. These ranged from anecdotal evidence of success to formal surveys of customers. Table 5.3 illustrates the different approaches that were taken.

Table 5.3: Sub-Categories of codes pertaining to ECIS evaluation

<table>
<thead>
<tr>
<th>ECIS Evaluation</th>
<th>Count</th>
<th>% in this category</th>
<th>% of Total Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of financial indicators to evaluate ECIS success: Monitoring of profit, turnover, ROI</td>
<td>52</td>
<td>21%</td>
<td>3.9%</td>
</tr>
<tr>
<td>Customer feedback (informal evaluation): Use of informal customer feedback on website to evaluate ECIS success e.g. email complaints; telephonic queries, ad-hoc management discussions.</td>
<td>38</td>
<td>16%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Anecdotal references to evaluation: Disparate evaluation concepts that were not categorised in any specific sub-category. In the main these were cursory references to evaluation during the interview.</td>
<td>36</td>
<td>15%</td>
<td>2.7%</td>
</tr>
<tr>
<td>Website usage data: site-hit rate, rate of browsers against actual sales, conversion of browsers to buyers, website usage data.</td>
<td>37</td>
<td>15%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Measuring business value: Measuring ECIS success by evaluating business value e.g. increased market share, and increase in customer base.</td>
<td>33</td>
<td>14%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Customer feedback (formal evaluation): Formal evaluation of customer satisfaction e.g. through questionnaire surveys.</td>
<td>15</td>
<td>6%</td>
<td>1.1%</td>
</tr>
<tr>
<td>System quality: Evaluation of technical aspects of ECIS through software testing, monitoring of bugs &amp; errors, exception reporting etc.</td>
<td>13</td>
<td>5%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Business &amp; IS perspectives of evaluation: Business managers have different views of ECIS success compared with IS functionaries.</td>
<td>12</td>
<td>5%</td>
<td>0.9%</td>
</tr>
<tr>
<td>No evaluation procedures: Businesses that had no inclination to conduct any evaluation of ECIS.</td>
<td>6</td>
<td>2%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Measure against systems planning objectives: Ex-post ECIS evaluation, using IS planning objectives as metrics.</td>
<td>2</td>
<td>1%</td>
<td>0.2%</td>
</tr>
<tr>
<td>Total</td>
<td>244</td>
<td>100%</td>
<td>18.3%</td>
</tr>
</tbody>
</table>

Most businesses assessed ECIS success by measuring the extent to which business objectives were achieved, with financial returns being
the most often used indicator of success. There were only a few examples of businesses which measured the technical aspects of ECIS such as software bugs, upload speed, error-rate, etc. The only component of ECIS that was evaluated with some degree of thought was the website, through formal customer surveys. Surrogate measures of success, as compared with technical IS metrics, were favoured by informants.

One of the issues highlighted in the review of the literature in Chapter 2, related to the difficulties involved in evaluating IS success. The evidence collected in this study confirms that this problem is no different in the e-Commerce environment, and is perhaps one of the reasons that none of the businesses involved in this study had a coherent strategy for evaluating ECIS. Two examples from the evidence that support this claim are:

“To my knowledge, none of the business units have a structured way of determining the effectiveness [of IS]? And I go on the fact that all my colleagues in group e-Commerce spent half of this year trying to gather the stats and I don’t remember there being any highlights in their report; they struggled across the board...” (Ridley, 2003).

“That’s very hard [referring to evaluation] to do – the hardest pillar in our business to measure is technology – no question. Firstly, because it’s so intangible – that’s the first thing and is the main problem” (Bothma, 2005).

The following sections discuss the approaches that informants used to evaluate success.

5.7.2 Using business-aligned measures as indicators of IS success

Table 5.3 suggests that ECIS evaluation is conducted mainly by using business-aligned metrics such as profit margins, customer satisfaction, and sales targets. One of the businesses that presented a good example of this approach, monitored financial metrics such as turnover and gross profit virtually on an hourly basis. This business has a management information system, which they call the “Business
Intelligence System (BIS)” (De Goede, 2004; Hammond, 2004) to provide various management reports. These reports are used by managers for both strategic and operational ECIS management. The CIO of this business outlined the critical inputs into their BIS system as follows:

“The very first one is the turnover and when I say turnover, it is turnover per product category. And that will drill down to the kind of product within the product category, etc. So it’s a detailed analysis, that is for senior management and we get it every day. We can see exactly what the turnover is, where it stands against budget and all those sort of things. Second to that is of course our Gross Profit (GP). And that goes as: If you don’t have a GP you don’t have a business” (De Goede, 2004).

![Figure 5.7: Using business value to produce management reports or “Business Intelligence” to facilitate IS evaluation](image)

Figure 5.7 above illustrates how business-aligned indicators were used by this business to evaluate ECIS. The BIS is at the core of both strategic and operational decision-making. Information from the BIS is used for both strategic as well as day-to-day running of the business. This includes activities related to management of ECIS. As one of its
core functions, the BIS provides hourly\textsuperscript{19} and daily sales reports, which are either used operationally or presented as detailed turnover analysis reports to senior management. Turnover is also monitored per product category which can be viewed at any time of the day. This report assists in monitoring feedback on marketing, customer profiling, and in identifying areas in which the business brand needs to be strengthened. Gross profit is also monitored daily in order that managers make decisions speedily when profits fall below expected margins. This constant evaluation of business-aligned metrics alerts the managers to ECIS problems. For example, if there is a drop in turnover, management immediately begins to examine whether there are any problems with the systems that may have caused this. In this way these metrics assist to evaluate the ECIS.

Other examples that demonstrated that managers used primarily a business lens to evaluate ECIS were:

“We know the constant of hits to sales is around 18%. So if suddenly it’s 12% well we know something is wrong with our site. Somehow they don’t get through the process as easily as they normally would or the product mix on the home page is not good. So that’s helps us manage how our site works” (Bothma, 2005).

“I’ve got to run the ship tightly from the ROI perspective. Every single day on my desk I’ll know how much sales, i.e., brand new sales are coming to the business. I’ll know what has been invoiced in the business. I know how many new customers have been acquired in the business. I know what discounts we have given today to customers ... Every single day I have a dashboard of the key metrics of the business. I run the business by these metrics” (Harris, 2005).

5.7.3 Financial indicators

In response to questions concerning ECIS evaluation, most informants indicated that gross profit and turnover were used as indicators of

\textsuperscript{19} It is interesting that this business monitored sales by the hour. However, there is no evidence that hourly information is actually of any value in business decision-making, except in industries that deal with highly perishable goods. Generally businesses do not require such a level of detail, as it could provide a false sense of security to managers.
success. Some examples of responses from business managers regarding how they evaluated success were:

“Well primarily it’s the number of transactions we do, and the value attached to those transactions. That I would say is your most clear indicator of the success of our systems” (Azeem, 2005).

“There’s a few key performance indicators which have to be in place, and those KPIs are turnover. But more important than turnover is what margin you are making on that turnover. They say that this is ‘turnover vanity’, so it’s not wrong if we brought in a hundred million rand. But are we making money? So there is the turnover target, the margin target, the number of order targets” (Meyer, 2005).

“We are not really interested in how many hits are we getting in daily, we just couldn’t care. We’re interested in how many orders do we get a day. That is the critical measurement of our systems, how many orders a day” (De Goede, 2004).

As profit is normally regarded as the main objective of business, the views expressed above may be satisfactory if one were to take a narrow view of ECIS success. However, businesses that evaluate success purely on financial indicators may, in focusing on this alone, make it more difficult to plan ECIS. As indicated in Finding Three, the e-Commerce environment is a dynamic one, and if profit is the only indicator of success, it would be challenging to make ECIS improvement decisions that would assist the business to cope with a changing environment.

5.7.4 Measuring customer satisfaction

User satisfaction, or in the case of e-Commerce business, customer satisfaction, has been well documented in the literature as a surrogate indicator of IS success. Therefore it was surprising that only a few businesses actually used formal customer survey instruments. Rather businesses tended to rely on informal feedback from customers, as demonstrated in the following excerpts:

“The key evaluation for us is what happens on the website and that evaluation takes place in two ways: the one is the informal feedback from the public and the second one is actual hard numbers” (Schreider, 2004).
“.. we get feedback from customers through telephone calls, and emails saying 'listen, why don’t you have x, y and z’, so we listen and now we’re implementing those things, putting them onto the site so our customers have that functionality they asked for (Azeem, 2005).

“We are very fortunate because we are a busy retailer; we get alerted by our customers straight away. We don’t have any mechanisms that help us monitor that, for example, there is something wrong in our shopping basket. But we know about it straight away because automatically our call centre lines light up. If I didn’t have that, I think I would have to build some systems where there’s something testing processes all the time – but fortunately we don’t need that (Bothma, 2005).

Of course, customer feedback will generally give a business an evaluation of the web-interface only. Businesses need to go deeper than just website evaluation since there are many other key backend ECIS that contribute to the e-Commerce operation. In addition to customer satisfaction, many of the notions expressed by informants in respect of customer feedback were concepts aligned to service quality. For example:

“So already you know that they are quite surprised by the quick turnaround time which increased the service level, they are very impressed by that. So we have the whole package deal where customers feel: ‘Wow, you know this is a good product, this is a person that knows what they’re doing’. That’s what is driving our success. And customers are happy, and then their risk is minimised completely and by the time they get their order they’re already sending their email back saying, ‘Great, thanks, stunning, thanks for the great service’. You know, those are the responses that I’m getting right now. So I’m giving it and I’m getting it back and so I think that’s a sort of a test, that it’s working to put it that way” (Wannenburg, 2005).

However, as is the case with customer-satisfaction, although service quality metrics are well documented in the literature, none of the businesses actually did any formal service quality evaluation.

5.7.5 Evaluating website usage

Another area that businesses used as a gauge of ECIS success was website usage. There are various software packages, such as Web Trends, that were used for this purpose. For example, one informant said the following regarding the use of such packages:
“I mean there are a lot of products that do this but they give you a lot of data, they don’t give you any information, and generally you have to extract that and interpret it for people. They can interpret it themselves but it’s generally hard work and quite a few people do it” (McGregor, 2004).

However, these packages only provide raw data, and the effort is in converting this data into useful management information, which many managers were not capable of doing. Examples of how managers found statistics concerning website usage of value were:

“The one thing that we were watching was really the number of hits that went into the site. This gave a broad idea of success” (Vennard, 2004).

“The hit rate has increased phenomenally like a good few 100% and we’re talking about in broad numbers from 80 visits a day to 220 visits. So for us that was a huge success” (Poswa, 2004).

“The last time I went on the Net checking out how many hits we had, it was increasing. You know as long as it’s increasing, as long as a lot of people are logging on, that’s a good idea of success (Pumela, 2005).

Reference to the use of website statistics to evaluate success was common in the evidence. However, the point has to be made, that this in itself is not a useful indicator of ECIS success. For example, it is short-sighted or possibly even naïve to believe that a drop in website hits from 18% to 12% is an indicator that “something is wrong with the website” (Bothma, 2005). Rather, businesses need to have an overall gauge of ECIS success, which should include evaluation of the back-end ECIS as well.

5.7.6 Summary of Finding Five

ECIS evaluation practices were generally fragmented, and not based on a well-designed set of evaluation objectives. The high incidence of informal evaluation practices is a concern. It is not possible to recommend any single method of evaluating ECIS. Rather e-Commerce businesses should engage in a multi-pronged strategy of assessing the key areas of success highlighted in these findings. Feedback on these issues would in turn give managers a holistic perspective of the success of ECIS.
5.8 FINDING SIX: A new focus on ICT as a direct facilitator of business success

ECIS performance is more easily understood through a business lens, as opposed to a technical, IS-oriented lens. In an e-Commerce environment, ECIS success should be a general management concern at the highest level. The ability of ECIS to service the web-based business initiative is regarded as being of paramount importance to the success of e-Commerce. ECIS success is therefore dependent on how effectively the business model has been conceptualised and implemented.

5.8.1 Introduction to Finding Six

The importance of ECIS, as articulated above, may possibly be just as relevant in the brick and mortar business domain. However, IS success has not previously been perceived as being a central business management issue. This finding focuses on the importance of ICT and is a major contribution in elevating the prominence of IS by relocating it from a “back-office” concern to that of a critical success factor from a business perspective.

The gist of this finding articulates that successful ECIS is associated first and foremost with the operationalisation of a well-planned e-Commerce business model. The evidence collected points out that all the notions associated with the e-Business-related hyperbole of the 1990s have been whittled down to the fact that basic business principles still apply and that there are no magically derived profits to be made from an e-Commerce venture. Business entrepreneurs now realise that creating a web-based sales medium in itself is not sufficient to realise profits. Indeed, many of the informants confessed to having subscribed to
various elements of the hyperbole when they started out their businesses. Two examples of references to this were:

“However in 2001 around April – May, when the dot bomb happened and crashed, so then we had to take business much more seriously. Now we had to have an actual business model — before that we were kind of just riding on the Internet wave. Now we have had to view this as a viable business proposition independent of any kind of hype” (Bothma, 2005).

“...and that’s the truth of how our business started — we got these guys to develop an online store and we hired one or two people to kind of manage the store, source products and do the books, take the payments, do the logistics and we were getting maybe around about one or two orders a day within the first month. After about a year of that those one or two orders were only 10 to 15 a day — and it was never a profitable business. But we were always saying, that we were taking over [believing that they were going to be profitable] and we were thinking at that stage: ‘That’s great that this is happening and within three years we are going to be retired, living in the Seychelles and it’s going to be all fantastic’. And then this IT bomb hit South Africa!!!” (Meyer, 2005).

One informant, when asked what was different between his online e-Tailing business and a physical store, stated quite categorically that

“... there is no difference between an e-Commerce venture and a brick & mortar business” (Rutter, 2005).

Another informant explained that

“I think at the end there is not much difference between e-Commerce and any other business. It’s actually just increased use of technology to facilitate the business.” (Pike, 2005).

Views such as these reinforced the importance of business principles as opposed to the importance of the technology. This therefore implied that ECIS success was inextricably linked with business success. There are views of IS success, however, that could be offered to counter this. For example in taking a systems quality view of IS success (Delone & McLean, 2004), one could argue that if the system is technically sound then it is successful. However within an e-Commerce context, the question is whether this sufficiently explains the concept of success. From the evidence in this study it appears that success is associated firstly with how well IS supports the business initiative. Thus the concept of ECIS success extends beyond that of technical success. Indeed, the majority of responses from both IS and business informants to questions
concerning ECIS success (refer to Table 5.4) pertain to concepts related to the achievement of business objectives.

Table 5.4: Business management sub-categories demonstrate substantive reference by informants to business-related concepts of ECIS success

<table>
<thead>
<tr>
<th>Business management sub categories</th>
<th>Count</th>
<th>% of this category</th>
<th>% of total codes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Business principles apply:</strong> Responses from informants that demonstrated that business principles are more important the IS, and that poor business processes are more likely to lead to e-Commerce failure as compared with poor IS.</td>
<td>49</td>
<td>20%</td>
<td>3.7%</td>
</tr>
<tr>
<td><strong>Robust business model required:</strong> Responses that either directly or indirectly attributed e-Commerce success to the implementation of a particular type of business model.</td>
<td>43</td>
<td>18%</td>
<td>3.2%</td>
</tr>
<tr>
<td><strong>Marketing:</strong> Concepts related to the marketing of the business through different media.</td>
<td>32</td>
<td>13%</td>
<td>2.4%</td>
</tr>
<tr>
<td><strong>Procurement of goods:</strong> The management of the procurement processes was considered an important activity by informants.</td>
<td>21</td>
<td>9%</td>
<td>1.6%</td>
</tr>
<tr>
<td><strong>Lack of IS knowledge:</strong> The lack of technical and management experience was highlighted as an impediment to success.</td>
<td>21</td>
<td>9%</td>
<td>1.6%</td>
</tr>
<tr>
<td><strong>Business strategy drives IS strategy:</strong> Business principles were prioritised in making decisions regarding IS.</td>
<td>20</td>
<td>8%</td>
<td>1.5%</td>
</tr>
<tr>
<td><strong>Daily management:</strong> Refers to routine management tasks that needed to be undertaken on a day-to-day basis.</td>
<td>16</td>
<td>7%</td>
<td>1.2%</td>
</tr>
<tr>
<td><strong>Strong business experience:</strong> Indicates that prior substantive experience in business had a positive impact on success.</td>
<td>9</td>
<td>4%</td>
<td>0.7%</td>
</tr>
<tr>
<td><strong>Management reports:</strong> The use of management reports in decision-making.</td>
<td>8</td>
<td>3%</td>
<td>0.6%</td>
</tr>
<tr>
<td><strong>Top management support:</strong> Refers to the need to have top management support for the procurement and effective management of IS.</td>
<td>6</td>
<td>2%</td>
<td>0.5%</td>
</tr>
<tr>
<td><strong>Change management:</strong> In brick &amp; mortar businesses change management strategies were an important factor to manage the introduction of web channels.</td>
<td>6</td>
<td>2%</td>
<td>0.5%</td>
</tr>
<tr>
<td><strong>Business management (general):</strong> Concepts that were not coded in any of the subcategories.</td>
<td>5</td>
<td>2%</td>
<td>0.4%</td>
</tr>
<tr>
<td><strong>Manage environmental factors:</strong> Refers to the impact of various influences external to the business and the strategies used to manage them.</td>
<td>4</td>
<td>2%</td>
<td>0.3%</td>
</tr>
<tr>
<td><strong>Project management:</strong> Relates to the involvement of business managers in IS projects.</td>
<td>3</td>
<td>1%</td>
<td>0.2%</td>
</tr>
<tr>
<td><strong>Disaster recovery plans:</strong> Plans to re-institute ECIS and bring the business back to operational level after a disaster.</td>
<td>1</td>
<td>0%</td>
<td>0.1%</td>
</tr>
<tr>
<td></td>
<td><strong>244</strong></td>
<td><strong>100%</strong></td>
<td><strong>18.3%</strong></td>
</tr>
</tbody>
</table>
5.8.2 ECIS: A facilitator of e-Commerce success

ECIS problems that were discussed by informants were associated with the way in which business processes were implemented and managed rather than with the technology. As one informant explained,

“It does not mean that the project is a failure [from an IS perspective] if we did not achieve our targets. But you know a 5% reduction in inventory could save a company millions, so we need to understand why that happened – and maybe you rectify it through fine-tuning. And generally we find that it’s not a problem related to the software but of the [business] process. The software solution usually works – especially if it is a COTS [referring to Commercial Off the Shelf Software] – it works in many other places. So what needs to work are the processes and the people who drive the process in the organisation and that’s generally where the failure comes from” (Mitchell, 2004).

The foregoing demonstrates the importance of ECIS as a facilitator of business processes. The following excerpt from an interview with the managing director of an international wine e-Tailer, further demonstrates this point:

SP: “From your perspective, what would you say are the main factors associated with your success?”

FP: “Focus on the product not the system – what I mean is that we are a wine company, and we use the Internet to the utmost capacity in terms of sales and communication and everything else – but I very rarely define the company as an e-Commerce company. I define it as a wine company” (Paulse, 2004).

Examples such as the latter point towards the business proposition being, in the first instance, a key ECIS success issue. Therefore managers of e-Commerce business ought to evaluate the business processes carefully before questions about ECIS success can be considered. One e-Commerce manager makes this point by suggesting that

“...as long as the business objective is a sound objective and has been thought through by somebody from a commercial perspective, then they can bring the IT people to do the work” (Cruywagen, 2004).

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20 This refers to the value proposition that the business offers a potential customer, i.e., the value created for users by the offering based on the technology (Eisenmann, 2002). Internet-based businesses need to offer a clear and compelling benefit to the online shopper, which in turn attracts the customer to the site and provides the raison d’être for spending money.
Another manager who regarded the business processes as more important than the ECIS, made the following comment:

“Customers are not going to think much of our business now are they? They’re hardly going to say to their friends: “You’ve got to use that business – they’ve got the coolest technology – they don’t deliver the goods – but they’ve got the coolest technology!!!” (Bothma, 2005).

An e-Commerce software developer who also recognised the value of having sound business processes in place suggested that,

“...high-risk clients are those who don’t have defined business models. In other words, it is anyone who doesn’t have an existing business, and they don’t have their processes in place when they contract out to us. They basically rely on us to develop their business on the Internet. The risk for those individuals is very high. The risk of failure is very high. If you have an existing business model that works, and you are starting a new medium and you are opening a new revenue opportunity for your business, then your chances for success are far better” (McGregor, 2004).

5.8.3 The importance of the e-Commerce business model (ECBM)

Examples of failure with e-Commerce pointed to problems with the business model. For example, two national companies, after considerable expenditure, closed down their e-Commerce operations.²¹ In neither of these cases were problems with ECIS contributory to the shutdown. In fact one informant (Vennard, 2004) actually boasted about the awards they had received for their website. Rather, the causes of failure in these two instances were attributed to a poor understanding of the target market. Managers who were in charge of the e-Commerce projects stated that their customers were not willing to switch to the online channel (Vennard, 2004; Chiles, 2005). There are two possibilities that could account for this. Firstly, the informants concerned

²¹ The companies concerned were (i) a national chain of grocery stores; (ii) a no-frills discount store selling a range of goods, from large appliances to stationery. Both these companies eventually shut down their e-Commerce sites, after realising that the costs of maintaining their infrastructure far outweighed the income they generated.
suggested that their customers were not sufficiently web-savvy so as to take advantage of the online offering. The second more probable cause of failure concerned the fact that these businesses did not implement an ECBM that offered an attractive value proposition to customers. In both cases there was no value added for the customer who used the online channel of these businesses.

The ECBM was also found to be inherently associated with a number of the challenges of managing ECIS. For example, one of the recurring problems concerned data quality and the processes applied to update the product database. If this problem is considered in isolation, it does not really appear to be unique to the e-Commerce environment. However, when the issues around the management of the database are weighed against Findings One to Four, then the reason for its importance within the context of an e-Commerce business becomes much clearer. This demonstrates how the uniqueness of the e-Commerce business model impacts on ECIS management. The distinctiveness of the e-Commerce business model therefore is the foundation upon which critical success factors of ECIS rest.

Having reflected on the 34 organisations involved in this study, the following key elements of the ECBM (in an e-Tailing context) were identified:

- An e-Commerce business is based on a model that compels the distribution of goods to customers. In this model, the business procures goods for sale, and has to find the means to distribute these goods directly to the customer.

---

22 Data accuracy and integrity are important considerations to any business, be it e-Commerce or brick and mortar. Thus any organisation that maintains a database will need to subject its database design and data loading procedures to careful planning.
The e-Commerce business is a direct marketing organisation. All the principles applicable in a direct marketing environment are also applicable in the e-Commerce environment.

While it is a generally accepted business norm to be able to satisfy the customer, the expectations of the customer are generally higher in the e-Commerce environment.

Customers have an expectation of personalised service. As a result, the e-Commerce business has to be responsible for maintaining accurate data about their customers, even though they may have shopped on the site only once.

The e-Commerce business has to maintain significantly different relationships with their suppliers. Whereas B2B relationships are an option with brick and mortar business, they are a critical component of the e-Commerce business.

The five elements of the e-Tailing ECBM described above are important considerations in this finding as the e-Commerce organisation is largely reliant on ECIS for its successful implementation.

5.8.4 Summary of Finding Six

Finally, Figure 5.8 summarises the salient points of this finding. The diagram illustrates that there are two important inputs to the ECBM, viz., e-Commerce business strategy, in the form of a viable value proposition, and IS strategy.

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23 The direct marketing strategy has been used by business for some time in the pre-e-Commerce era. In this model, businesses marketed their goods through television and print media (newspapers, magazines, posted brochures). Customers would then either order goods through the post, or by telephoning a call centre. The goods would then be delivered directly to the customer.
Figure 5.8: e-Commerce success is facilitated by business and IS strategy

Jointly, both these elements of strategic input are important facilitators that are required to successfully implement the ECBM. This in turn underscores the fundamental premise of this finding, viz., the ability of ECIS to service the web-based business initiative is regarded as being of paramount importance to the success of e-Commerce; and that ECIS success is therefore dependent on how effectively the ECBM has been conceptualised and implemented.

5.9 Conclusion

This chapter, in forming the cornerstone of this thesis, has presented six findings in response to the research questions (Refer to Table 5.5).
Table 5.5: A correlation between the research questions and the six findings

<table>
<thead>
<tr>
<th>RESEARCH QUESTIONS</th>
<th>CUSTOMER CENTRICITY</th>
<th>HARMONISATION OF BUSINESS &amp; IS MINDSETS</th>
<th>AGILITY OF THE IS FUNCTION</th>
<th>MANAGING ECIS QUALITY</th>
<th>CONTINUOUS EVALUATION ECIS : DIRECT FACILITATOR OF BUSINESS SUCCESS</th>
</tr>
</thead>
<tbody>
<tr>
<td>How does ECIS contribute to successful business?</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>What are the drivers of ECIS success?</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>What are the important management issues that affect the success of ECIS?</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

These findings have brought to the fore the following:

- Firstly, the nature of the ECBM is such that any negative impact on the customer, will lead to business failure. This requires that ECIS, in supporting the implementation of the ECBM, should be customer-centric in the way it is designed and managed. This implies that ECIS at all levels of the business should be considered in terms of its direct and indirect impact on the customer.

- Secondly, successful ECIS is dependent on the extent to which business and IS stakeholders are harmonised in their approach to IS management. It is clear the ECIS is not the domain of the technical IS personnel only. Rather it is a combination of a harmonised business and IS grouping that leads to success.

- Thirdly, the e-Commerce environment is subject to constant change. As such, the organisation is required to be agile in the way ECIS are managed in order that the systems are able to support the constantly evolving needs of the business and its customers.
Fourthly, there are key aspects of ECIS functionality that warrant special focus in terms of quality. The maintenance of quality of these ECIS components is critical in ensuring that business objectives are successfully achieved.

Fifthly, e-Commerce businesses are required to evaluate ECIS using more formal evaluation procedures. These procedures should be instituted to measure ECIS in terms of quality, how it impacts on the customer, and the way in which it supports the business model.

Lastly, the success of the ECIS deployed in an e-Commerce business is underscored by a carefully planned business model. Therefore ECIS success needs to be understood through a business lens as opposed to a technical lens. The unique pillars of the e-Commerce business model imply that ECIS is a direct facilitator of e-Commerce success, and therefore has an elevated importance when compared with brick and mortar businesses.

The juxtaposition of the six findings presented in this chapter is used to derive the ECIS Success Theory. The relationships between these findings and the resultant theory are discussed in Chapter Six.
CHAPTER SIX

ECIS SUCCESS: A THEORETICAL CONTRIBUTION & CONCLUSIONS

“Obviously the work is not finished, and can never be finished. There are no absolute positions to be reached in the attempt by men to understand the world in which they find themselves”

(Checkland, 1986: xii)

Overview

This chapter brings the research to a conclusion, by presenting an ECIS Success Theory, which is an original contribution to the body of knowledge. The chapter firstly discusses how the theory was derived from the findings, after which the importance of the new theory and its relevance to e-Commerce businesses and academe are examined. Following this, the research outputs are evaluated in terms of three fundamental qualitative research criteria, viz., credibility, transferability and dependability. The latter includes a presentation of a research audit trail. Several limitations of the study are reflected upon, before avenues for future research are discussed. The chapter ends with a conclusion that the research has been valuable both to the researcher, and also to the community of stakeholders in which the research was conducted.

6.1 Introduction

The findings in the previous chapter, which have provided insights into the factors affecting ECIS success, collectively serve as a set of management guidelines for the e-Commerce environment. While the bedrock for this work was the extant literature, it was these findings that provided the foundation upon which the final outcome of this study is derived. Using the adopted framework for theory development as a guide, and through further reflection, this chapter integrates these research findings, into a theoretical contribution.

In their seminal work on grounded theory, Glaser and Strauss (1967) claimed that theory had become synonymous with the theories of the great men such as Marx, Weber, Durkheim, Mead, etc. These theories
would then be confirmed by “subsequent, less brilliant minds through short-sighted exercises in verification” (Alvesson & Sköldberg, 2000:16). It was against this premise that Glaser and Strauss launched their rather liberating thesis that anyone can create their own theory, so long as they start from reality, and therefore

“... not only geniuses and theoretical capitalists can be creative in social science research. Even ordinary mortals can generate creative input as scientific entrepreneurs; they do not have to act as a verifying proletariat serving intellectual big business”


Although this quotation is perhaps an exaggeration, these authors make a valuable point. They bring to light the strides that social scientists have made since the 1960s in the area of theory generation. As a result of the work of Glaser and Strauss, it is now widely accepted that even postgraduate students are capable of developing theory.

The theory presented in this chapter, which has been inductively grounded in evidence collected from knowledgeable informants, is my contribution to the body of theoretical knowledge.

6.2 The derivation of an ECIS Success Theory

The final stage of theory development entailed establishing relationships between the findings. The six findings that were derived were:

- Customer-Centricity.
- Harmonisation of Business and IS mindsets.
- Agility of the IS function.
- Managing ECIS quality: Key aspects of functionality.
- Continuous assessment of ECIS.
- A new focus on ICT as a direct facilitator of business success.
Of course a list of findings cannot be the only outcome of a doctorate, as Henning (2004: 117) suggests:

“Theories are not lists of findings, but coherent arguments that explicate and explain social processes and phenomena. The strength of the theory will depend on the power of the data, the clarity of both gathering and analysis procedures, and the ability of the researcher to conceptualise concrete detail. This conceptualisation process is infused with elegant analysis and synthesis of empirical detail. A thorough grounded theory study is thus a deeply reflexive activity.”

In developing the theory I carefully studied the findings several times, interacted with the evidence to clarify the positions that were taken, and engaged in reflection\(^1\) on the evidence. During this period of reflection I found myself searching for a set of rules that would guide the theory formulation. However, I soon established that there were none, with authors such as Remenyi et al. (1998:79) offering the following advice regarding theory development:

“... there is no structured methodology for doing this [developing a theory]. Rather this aspect of research or scientific study can be regarded as an art that relies almost entirely on the imagination and creative abilities of the researcher. It is precisely here that science and thus research becomes truly creative”.

Thus through a combination of reflection and creative thought, I made the following observations:

- The first finding, which dealt with the importance of CC, is a focal point, enabling all other findings to flow from it.
- Customer-centric ECIS are managed with an emphasis on agility, and the implementation of decision-making mechanisms and organisational structures that promote a harmonisation of business

\(^1\) This included applying hermeneutical interpretation, i.e., constant comparison of parts to the whole. Using hermeneutic terms, in this instance the six findings were the parts, and the whole was the emerging ECIS success theory.
and IS mindsets. These are important ECIS management considerations that support the deployment of customer-centric ECIS.

- CC is sustained through the development and management of reliable ECIS. Several key areas of ECIS functionality were identified in this respect.
- CC is embedded in the e-Commerce business model, which incorporates both business and ECIS strategy. This model is the foundation that provides the e-Commerce organisation with a sense of clear purpose and direction in selecting, developing and managing ECIS.
- CC is sustained by the implementation of a coherent strategy which enables the e-Commerce business to continually evaluate the drivers of ECIS success.

The foregoing represents the result of applying reflection and creativity to the findings. It arose through a series of thought experiments, the objective of which was to establish a credible explanation of the interrelationships between the findings. Figure 6.1 presents the outcome of this process.
Chapter 6: ECIS Success: A Theoretical Contribution & Conclusions

FINDING 6
• The business model encapsulates the fundamental business & ECIS strategy.
• ECIS success is dependent on how effectively the business model has been conceptualised and implemented.

FINDING 1
• Customer-centric ECIS are key to successful e-Commerce.

FINDING 2 & FINDING 3
• Management techniques & appropriate organisational structures are required to promote harmonisation of business & IS stakeholders.
• An agile approach to the development, and management of ECIS.

FINDING 4
• Effective back-end systems are as vital as a well-designed website.
• A more comprehensive view of ECIS quality is required.
• Stringent management of the key aspects of ECIS functionality.

FINDING 5
• Evaluation of changes in environment
• Monitor ECIS management practice;
• Evaluate drivers of CC
• Evaluate ECIS quality.

Figure 6.1: The linking of findings through reflection and creativity

Although this diagrammatic representation is organised linearly, it does not imply that its derivation arose through linear thought processes. Rather it was through constant interaction of the findings, the raw evidence, and the comments from informants during the verification phase of the research that influenced the creativity in seeking out the relationships. This process eventually led to the derivation of an ECIS Success Theory, which is stated on the following page. The theory was also subjected to further reflection, and is represented diagrammatically in Figure 6.2. According to Miles and Huberman (1984), whereas in the physical sciences a theory will frequently be expressed as a formula or as a series of simple propositions, in business and management research the theory is often reduced to a diagram for the purpose of clarification.
ECIS Success Theory

ECIS success is underpinned by a mindset, which sees Customer-Centricity (CC) as one of the primary drivers of e-Commerce. CC pervades the key e-Commerce processes. However, CC alone is unlikely to lead to an optimal e-Commerce solution. For sustained success, business and IS mindsets need to be harmonised. Additionally, as customers’ tastes and preferences change, so too should the ability of the business to be responsive to these changes. Responsiveness is realised through the design of agile processes and systems. Implicit in the understanding of these three critical success factors, viz., CC, harmonisation, and agility, is that e-Commerce processes are supported by high quality ECIS that are reliable and easy to maintain. To ensure success, all four of these factors need to be integrated into a competent business model. ECIS success will be sustainable by the continuous assessment of CC, harmonisation, agility, changing environmental factors, and the quality of ECIS.

Figure 6.2: Diagrammatic representation of the ECIS Success Theory
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6.3 Importance of the findings

Currently researchers have taken diverse approaches to the study of ECIS success, with equally diverse foci in respect of the units of analysis. This has resulted in a fragmented body of knowledge.\textsuperscript{2} There are several possible reasons for this. As a phenomenon of the 1990s, e-Commerce is relatively new, and as such the body of research in this field is still evolving. This is clear when one considers the lack of theoretical underpinning in several studies, and the eclectic range of theories that has been applied in others. Another possible reason is that many researchers have attempted to adapt theories and models that have been applied to the traditional brick and mortar business domain, without a more comprehensive understanding of e-Commerce.

During the e-Bubble era a proper understanding of the role of management in e-Commerce was hindered by talk of the new economy.\textsuperscript{3} During the nascent years of e-Commerce, it was suggested that the fundamental rules of business related to profit and cash flow had changed. The reality is that there may or may not have been a new economy, but there certainly was no new economics. This type of thinking distracted e-Commerce businesses from sound management practice, as it was believed that the implementation of web-based technology in itself was sufficient to lead to profits. Thus the value of the ECIS Success Theory is that it refocuses our attention to the importance of both business and IS management in the e-Commerce environment.

There has been a lot of disinformation about how e-Commerce works. This theory offers a means of dispelling the myths that have entrenched

\textsuperscript{2} The pre-e-Commerce body of knowledge has also been criticised as being “non-cumulative and fragmented, lacking an overarching framework…” (Grover et al., 1996: 178).

\textsuperscript{3} There is no clarity as to when the notion of the “new economy” was first articulated, but it was during the early 2000s (Toffler & Toffler, 2001). The new economy was heralded as a fundamentally new way in which economies or economic systems had begun to operate (Patel & McCarthy, 2000).
themselves since the e-Bubble era. The ECIS Success Theory thus offers a more comprehensive view of the challenges involved in managing e-Commerce business rather than the eclectic and inchoate ideas that have largely prevailed to date.

The theory produced in this study is also of value in that it provides a coherent understanding of ECIS success, through the juxtaposition of a number of areas of study. The theory addresses the areas pertaining to business strategy, IS strategy, business and IT alignment, and IS evaluation. In the area of IS evaluation, the ECIS Success theory takes current research a step forward. Whereas a number of studies have focused on specific metrics to evaluate ECIS, the metrics exist in isolation from a comprehensive understanding of ECIS success. Thus the ECIS Success Theory provides a context to assist our understanding of factors that affect ECIS performance. Additionally, the theory provides a framework within which to enhance existing approaches to evaluating ECIS success, and a basis upon which new ones can be developed.

Indeed during the confirmatory phase of this study, which involved interviews with several additional e-Commerce managers, as well as South African and overseas IS academics, there was mainly positive feedback regarding the findings and the ECIS Success Theory. Some of the comments made were:

“The findings are right on the money. Some of these findings bring to the fore lessons we learned the hard way. This is certainly important to us, and especially the newer guys” (Potts, 2006);

“This actually represents what I would consider to be best practice, and if we had this kind of comprehensive understanding seven years ago when we started, we would have avoided many of the mistakes that we made... This is also presented in a way that is easy to digest and understand” (Harris, 2006);

“If start-ups are schooled with this type of knowledge, they are bound to have a better chance of success. When we started out, we had to literally think on our feet, and learn along the way” (Azeem, 2006);

See DeLone and McLean (2004) for a comprehensive review of IS evaluation metrics in the e-Commerce domain.
“What you have presented here, tells me that you probably have the best understanding of the mechanics of e-Commerce –more so than we ourselves have” (Poswa, 2006).

It was also pointed out that the development of an ECIS Success Theory is timeous in that the South African e-Commerce business climate has become competitive:

“This seems to be the absolute right time to highlight findings like these. We’re experiencing more and more competition, and your findings help to pinpoint important issues that we have been experiencing” (Azeem, 2006).

The foregoing statement by Azeem, alludes to the low Internet adoption rate by consumers that has characterised the local South African market. Until recently the online retail market had been dominated by a few e-Commerce businesses only (Goldstuck, 2002; Goldstuck et al., 2006). However, the climate is changing as more businesses adopt Internet-facilitated business. Therefore research such as this will be of value not only to the e-Commerce sector at large, but more especially to the SME sector. There have been several examples quoted of small business entrepreneurs who have experienced great difficulty as they are “daunted by the complexity involved” in setting up their business on the Web (Tulleken, 2006:3). It is therefore important that the findings of this study are of value to both academe as well as industry-based e-Commerce stakeholders. Thus, in compiling the findings, I took into account the criticisms that have been levelled at the value of management research (Starkey & Madan, 2001) and that of the relevance of empirical IS research (Benbasat & Zmud, 1999).

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5 One of the motivations for this study was to contribute to our understanding of ECIS success, so that the SME sector in South Africa would be able to harness the Web and the Internet with more success. Mainly owing to apartheid policies, the SME sector in South Africa is characterised by entrepreneurs without post-school qualifications. As such, they would require knowledge in a simple format, which is easy to digest and apply in their businesses.
Remenyi and Money (2006) advocate that it is not necessary for a theory to be a complete explanation of a phenomenon. This is supported by Strauss and Corbin (1998:266-267), who posit that a substantive theory (one developed from the study of one small area of investigation and from a specific population) does not have the explanatory power of a larger, more general theory. It cannot, because it does not build in the variation or include the broad propositions of a more general theory. The real merit of a substantive theory lies in its ability to speak specifically for the populations from which it was derived (Strauss & Corbin, 1998). The positive feedback by informants during the confirmatory phase of the research therefore suggests that the ECIS Success Theory is meritorious.

In summary, the e-Commerce practitioners who participated in the final phase of the research were supportive of the relevance and comprehensiveness of the six findings and the ECIS Success Theory. This, therefore, has positive implications regarding the relevance and usefulness of this research to organisations involved in e-Commerce.

6.4 Evaluation of the research

In keeping with the qualitative tradition, the principal evaluation approach that I have adopted is one of confirming the research as opposed to arguing for its reliability and validity. This involves various strategies to enhance the credibility, transferability and dependability of the research findings.

6.4.1 Credibility of the research

The credibility of this research can be attributed to the use of three strategies:

- Triangulation.
- Referential adequacy.
Submission of the evidence to checks by members of the research community (referred to as member checks).

Triangulation refers to extending understanding, or adding breadth and depth to analysis, through the use of multiple perspectives (Ritchie, 2003:43-44). In this study, the interview transcripts formed the primary source of the evidence. Multiple perspectives of this evidence were obtained from documentation supplied by informants, and information gleaned off the websites of the businesses studied. In addition to this, extensive field notes that were taken during the interviews were used to crosscheck interview transcripts. Summarised versions of the transcripts were also used.\(^6\)

Referential adequacy relates to providing proof of the existence of the evidence that has been collected. All the tape recordings, the transcripts, documentation from businesses, and field notes have been retained, and are available for the purposes of an audit.

Member checks were conducted with industry practitioners as well as the academic community as follows:

- During the evidence collection phase, informants were provided with summarised notes of the salient aspects of the interviews on which to comment. This feedback improved the quality of the interview evidence.
- I also presented research-in-progress papers at four academic, peer-reviewed conferences as well as at university seminars.\(^7\) Additionally, three journal articles were published at appropriate junctures of the research.

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\(^6\) Refer to Figure 4.1 in Chapter Four for an overview of the different sources of the evidence, and how they relate to one another.

\(^7\) I presented seminars at three universities, viz., Trinity College, Dublin; Queen’s University, Belfast; and University of Erlangen, Nuremberg. Four conference papers were presented at SAICSIT 2003 (Johannesburg); ISOneWorld 2004 (Las Vegas); SAICSIT 2004 (Stellenbosch); ECITE 2004 (Amsterdam).
During the final confirmatory phase of the research, I conducted 14 interviews during which the value of the findings to the practitioner and academic community were discussed.

The foregoing is indicative of the diverse strategies that were employed to enhance the credibility of the research, not just at the closing stage but also while the research was in progress. The feedback that I received from the research community has been invaluable insofar as it has helped me improve my understanding of the findings.

6.4.2 Research transferability

In qualitative research, the reader makes judgements about transferability of the findings. This is made possible by reporting the findings with sufficient detail by using “thick descriptions” (Lewis & Ritchie, 2003:268).

The higher order narrative in Chapter Five meets the requirements for the thick description that is required. The discussion of ECIS success is immersed within the evidence that was collected. The narrative is supported throughout by excerpts from the interviews to reinforce the discussion. This provides a basis for the findings to have some degree of transferability.

6.4.3 Dependability of the research: an audit trail

The research audit trail is a concept which has been borrowed from the Accounting and Auditing professions where it is required in order to be able to validate values which have been entered in the organisation’s books of account. The audit trail is designed to allow for an inspection of how the values in the final accounts were originally entered into the accounting system. The audit trail should also show who authorised expenditure as well as who generated income.
In the research world, there are two possible types of audit trails, viz., an intellectual and a physical audit trail. An intellectual audit trail indicates how the research unfolded, starting with the researcher’s original interest to the final assertion that something of value has been added to the body of knowledge. Figure 6.3 presents an intellectual audit trail which represents the evolution of my thinking regarding research over the past five years.

*Figure 6.3/*
1. Commencement of study
I commenced the study in 2002 with a thorough positivistic grounding. This was the result of the quantitatively oriented research undertaken during my Master’s degree.

2. Inappropriateness of intellectual grounding
After having conceptualised the research problem and associated research questions, I realised that the ambit of my positivistic outlook to research was restrictive, e.g., I considered using surveys to collect evidence, but after reflection, realised a quantitative approach would not provide suitable evidence for theory development. At this point, my thinking about research was significantly enhanced as a result of being chosen to participate in an intensive 12-month doctoral research capacity-building programme, funded by the South-Africa-Netherlands-Research Programme on Alternatives in Development (SANPAD).

3. The quest for a philosophical position
After substantive reading, and discourse with my supervisor and other academics, I realised that research at doctoral level required a firm epistemological positioning, before considering how to design the empirical undertaking.

4. Critical realist position
I undertook an exploration of the tenets of positivism, interpretivism, and critical theory. As a result I concluded that critical-realist (CR) theory would form an appropriate underpinning for this study, in that it transcended the conflicting positions between positivists and interpretivists.

5. Pursuing options to collect evidence for theory development
As the GTM had increased prominence in the IS literature over the past decade, I opted to investigate this approach as a strategy for developing theory. After closer examination, there were problems with the GTM that conflicted with CR, viz., the requirement that I entered the research field with a tabula rasa. Other problems with the GTM were associated with the arduousness of micro-coding, and a lack of direction regarding how to interpret the evidence. This led to the implementation of an adapted GTM, and led also to the use of software to improve the manageability of the large body of evidence.

6. Interpretation of evidence.
My CR position steered me towards a hybrid approach in interpreting the evidence. The Swedish philosophers Mats Alvesson and Kaj Sköldberg, who advocate the use of reflexive methods in research, were influential in this regard. Thus, my interaction with the evidence took place through a combination of hermeneutical interpretation and reflection, with the use of a CAQDAS to facilitate the linking and organising of concepts.

7. Transitioning a broad body of evidence to a set of management guidelines
The strategy for reporting on the evidence entailed the use of narratives, at various levels. This was clearly suited to the qualitative approach taken, and encouraged the creativity in reporting research that is called for by Alvesson & Sköldberg. This approach was also suited to my realist stance, in that it provided the flexibility to reflect critically at all times on the research process. Thus the research process entailed an evolvement of the evidence from a primary narrative, to concepts, to a higher order narrative, and lastly to the findings. These findings constituted a set of guidelines for e-Commerce managers.

8. Development of the ECIS Theory
Hermeneutics, and reflection were used once again to establish relationships between the findings. This led to the derivation of the final theory.
A physical audit trail on the other hand traces the key stages of the study from inception to the final theory. It shows the key decisions related to the research methods. A physical audit trail for this study is presented in Figure 6.4 on the following page.

In general, both audit trails demonstrate that the research has been conducted within a logical and coherent framework, and as such enhances the dependability of the findings.
1. Identification of problem in the e-Commerce environment

My interest in e-Commerce was as a result of interaction with industry stakeholders. After a preliminary literature review in 2002, potential research questions were explored with e-Commerce managers during a knowledge café and a focus group session. This two-pronged engagement brought the following problem to the fore:

Even though e-Commerce is considered to be an important business issue in the new South African economy, managers did not have a thorough understanding of how ECIS could be effectively managed to successfully conduct e-Commerce. Furthermore, there was limited empirical evidence in the literature to assist the business community to develop a coherent understanding of ECIS success.

2. The research proposal

Based on the preliminary work undertaken above, a research proposal was developed and submitted for consideration to the Higher Degrees Committee of the University. After effecting changes recommended by the committee, the study was registered in 2003.

3. Finalisation of the research questions.

The following research questions were finalised, after 8 interviews with knowledgeable informants.

In e-Commerce environments:
1. How does ECIS contribute to successful business?
2. What are the drivers of ECIS success and how do they relate to one another?
3. What are the important management issues that affect the success of ECIS?

4. Review of literature

A thorough review was conducted of the extant literature, covering both e-Commerce and pre-e-Commerce studies on IS success. The review established that the body of knowledge was fragmented, and that no suitable IS Success theories were to be found. This led to an important decision, viz, that the research questions would be best answered by inductively deriving an ECIS Success Theory from empirical evidence.

5. Interview schedule

Readings from the literature, as well as issues identified during exploratory fieldwork, led to the formulation of the interview schedule.
6. Identification of knowledgeable informants
The informants were identified as those stakeholders of e-Commerce businesses who have an in-depth knowledge of the management of business operations (at both tactical and strategic levels) and who by virtue of their responsibilities have a vested responsibility for the successful outcome of e-Commerce initiatives. This included managers who were responsible for ECIS. Using both theoretical and purposive sampling, informants were identified and approached to participate in the study.

7. Obtaining the evidence
In taking a qualitative approach to the research, a total of 51 semi-structured interviews, lasting an average of 1 hour each, were conducted, among 35 organisations. Interviews were tape-recorded and subsequently transcribed. These transcriptions, together with the researcher’s field notes, documents supplied by informants and information from the businesses’ websites, formed the primary narrative.

8. Managing & analysing the evidence
A modified GTM was used to categorise the evidence, using NVivo (V2). Both reflexive interpretation and hermeneutical techniques were used to facilitate the interpretation of the evidence. The application of NVivo was later on verified with a NVivo consultant. The evidence was subsequently synthesized into ten categories, each of which consisted of several sub-categories. After establishing relationships between the categories, six major themes were inductively derived.

9. Reflection and write-up of the findings
After reflecting on the body of evidence, the results of the analysis, and the six themes, the findings were written up as a higher-order narrative. The narrative incorporates detailed descriptions of the drivers of ECIS success, and is substantiated extensively by reference to statements made by the informants. Further reflection on the higher-order narrative led to a juxtaposition of the findings into an ECIS success theory.

10. Confirmation of findings
The findings were presented to several e-Commerce practitioners and IS academics, by conducting 14 more interviews. Interviews with academics entailed confirming the research approach that had been taken. These inputs led to the refinement of the findings and the ECIS success theory.

Figure 6.4: A physical audit trail
6.5 Limitations

Having now reflected on the research undertaken over the past five years, a number of limitations have come to mind. Some of these have been identified only at the conclusion of this study as a consequence of the extensive experience that I have gained in the application of research methods. While I was aware of other limitations, such as that of time constraints during the course of the study, many were due to factors beyond my control.

6.5.1 Collection of evidence

I experienced several difficulties in identifying and accessing suitably knowledgeable informants. While both time and financial constraints were a factor in this regard, another challenge was that several informants whom I approached were not able to offer their time for interviews. Furthermore, gaining access to an organisation in itself did not imply that I could make contact with appropriate informants. There were several managers who referred me to less senior staff members of their organisations. At times this proved to be less than ideal as I really would have benefited more from evidence from informants who had a higher-level overview of the e-Commerce issues in their organisation.

I also preferred to collect evidence from more than one stakeholder per business. This, however, was not always possible, and I had to rely for the purpose of triangulation on other evidence such as the website or other published material to corroborate their evidence.

The absence of a South African directory of e-Commerce businesses was also a limitation. In the main I had to rely on media reports and private industry-based research to identify important e-Commerce role-players. Although the methods of theoretical and selective selection that were used are accepted techniques for scientific research, I am of
the view that I would have been able to reach a point of theoretical saturation in the research more quickly if I had had a clearer well-defined list of businesses to work from.

6.5.2 Volatility of the e-Commerce environment

The South African e-Commerce market has been volatile, especially over the last five years in terms of e-Commerce thinking and practice. Many new ideas have been attempted, and as mentioned in Chapter One, quite a number of organisations have failed. But contrary to perceptions in some quarters that South Africa is far away from innovative business practices, this is not the case. For example, South African banks are regarded as world leaders in e-Banking.

Thus I had difficulty in keeping up with the changing business environment, which affected the continuity of the development of my ideas. For example, I had negotiated with the CEO of one company to make a repeat visit, as there were several important issues which required follow-up. At this point I had already analysed the evidence that I had collected during my initial visit to this business. I required further evidence to improve my understanding of ECIS management in that environment. However, in the three months that it took to secure an appointment, the company had restructured its IS department and had implemented new database and order processing technologies.

The dynamic nature of the e-Commerce business environment was also evident in the literature. As such it was a challenge to keep abreast with the proliferation of literature on this topic. Furthermore, the subject of e-Commerce has been studied in various disciplines. Thus the problem was exacerbated, as I had to follow developments from more than one stream of literature.
6.5.3 Resource and time constraints

Being a fulltime member of faculty, the free flow of idea generation, creativity and reflective thinking were constantly interrupted by my commitments to the university. The difficulties posed by time constraints also impacted on my ability to synchronise my fulltime work schedules with those of the informants. This was especially challenging when I travelled away from my base in Cape Town to other major South African centres.

During the course of this study, I was fortunate to have presented my research at four conferences and at seminars that I led at three universities overseas. However, I would have liked the opportunity to share the findings, as they were being developed, with a wider audience. However, opportunities for colloquia and conferences are limited in South Africa, and travel to Europe and North America is costly.

6.6 Future research

The phenomenon which we call e-Commerce is no more than a decade and a half old. During this period it appeared to rocket to success, and then plummeted as the e-Bubble burst. The current renewed wave of e-Commerce initiatives is more sober. As a result the business community is looking to academia for a new understanding of how e-Commerce investments should be managed and evaluated. My work comprises one of many small steps which have been taken in this regard over recent years, and its outcomes could provide the basis for future work in several areas of IS research.

It is standard practice in the scientific community to subject research findings to further exploration, testing and verification. The ECIS Success Theory presented in this chapter was verified through a small sample of informants through in-depth interviews. An immediate avenue
for future research could therefore entail conducting further interviews with a larger sample of informants so as to affirm or extend the theoretical conjecture. Such a study could even be conducted in other geographical regions, as well as in other e-Commerce domains such as B2B, and B2G to determine the transferability of the findings to other research settings. Alternatively the research findings could be translated to a series of formal statements and included in a questionnaire. This would facilitate a survey of a larger subset of the e-Commerce practitioner community. The quantitative data generated from such a survey could, through statistical analysis, be used to verify and refine the current findings.

The next avenue for future research arises from the key finding dealing with CC. This finding has highlighted the importance of back-end ECIS in supporting the attainment of customer-centric e-Commerce. This implies attaining a high level of customer satisfaction and e-service quality. The finding provides an appropriate framework to investigate, in further depth, specific criteria by which customer-centric ECIS should be evaluated. In so doing current research into service quality conducted within the marketing literature (e.g., Zeithaml et al., 2002; Parasuraman et al., 2005) could be extended to take into account the impact of all elements of ECIS infrastructure.

The second finding concerning harmonisation of business and IS mindsets also poses avenues for further research. The current literature has established that the relationship between IS providers and their business clients is an important indicator of IS success. This finding offers a basis to extend research in this area by specifically investigating harmonisation. To date researchers have focused only on the clients’ perceptions of the service provided by the IS function (e.g., Pitt et al., 1997; Watson et al., 1998) without regard to the impacts of harmonisation on these perceptions. Thus there is potential to merge existing research in IS-Business alignment (e.g., Luftman, 2003;
Coughlan et al., 2005) with that of the evaluation of IS success. Furthermore, in South Africa, a number of e-Commerce businesses that participated in this study used outsourced IS providers. This outsourced relationship, in particular, also requires investigation, as the dynamics involved in this situation are different from those of the in-house IS-business relationship. This finding therefore presents an opportunity to identify ways to improve the synergies between these two parties.

The finding dealing with the agility of the IS function is a third area for future work. This offers an opportunity to consolidate IS research which has primarily dealt with “flexibility” of IS (e.g., Shi & Daniels, 2003). The current literature has tended to focus on this problem from narrower perspectives such as user involvement in IS planning (e.g., Palanisamy, 2005) and technologies to support supply chain agility (e.g., White et al., 2005). This finding extends current thinking by bringing to the fore the importance of organisational structuring and decision-making processes.

The findings as a whole challenge the application of the oft-cited IS Success Model (DeLone & McLean, 1992). Although the authors claim that their updated model is “a useful model for developing comprehensive e-Commerce success measures” (DeLone & McLean, 2003:27), in their attempt to demonstrate this (DeLone & McLean, 2004), only website-aligned success metrics are identified. The model therefore does not take into account (i) the impact of particular IS management practices on IS Success; and (ii) metrics to evaluate backend IS. Thus, a further avenue for future research would entail extending and possibly re-specifying the IS Success Model for the e-commerce environment through further exploration of the findings of this study.

Finally, the current wave of e-Commerce, referred to as Web 2, requires investigation in the light of the findings on ECIS success. The term Web 2 is currently used to describe Web applications that are more personally
oriented to the Web user than were previously offered. This is clearly associated with the finding on CC. Thus research needs to be conducted into the technologies being used by Web 2, to establish how they would support CC, as discussed in this study. Furthermore, as far as I am aware, the term ECIS has not been used in any previous study. Thus in the context of Web 2, the concept requires further exploration and possible extensions to it, so that it becomes more representative of Web 2 technologies.

6.7 Concluding remarks

This research was conducted over a five-year period. In this time I have engaged in a discourse with industry practitioners as well as academics, and I have also read a substantial body of research literature. The ECIS Success Theory that I developed is a product of all of these interactions. While I have worked towards producing a theory, I acknowledge that it is not possible to encompass all the issues and all the relationships in the domain of ECIS Success. This point has been made by several philosophers of science, including Feyerabend (1993:39), who maintains:

“We may start by pointing out that no single theory ever agrees with all the known facts in its domain. And the trouble is not created by rumours, or by the results of sloppy procedures. It is by experiment and measurement of the highest precision and reliability.”

I do not suggest that my findings are the only answers to the research questions that I set out to answer. There could be alternative views upon which ECIS success is based. This is a matter for further research.

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8 For example, the perceptions of web-site users (or customers) are an important factor in determining ECIS success. However, as pointed out in Section 2.16 this issue is already well documented in the literature. As such this study has contributed to the gap in the literature by focusing on ECIS management issues within the e-Commerce organisation.
to develop, extend, or disprove the theory presented here. However, within the context of the reliability of the research approach, and the exercise in verifying and confirming the research outcomes, I can conclude that what I have presented are competent and useful answers to the research questions at this point in time.

Thus this particular journey of intellectual pursuit ends. It has been an invigorating exercise and I am consciously aware of the renaissance that has taken place deep within my intellectual being. There is no absolute truth and as researchers all we can do is strive to produce theory which can make some difference to the understanding of members of our community. As Babbie and Mouton (2001:8) point out,

“There is no such thing as an instant verification of a hypothesis or a theory. Even when a scientific community accepts certain points of view, hypotheses or theories, as valid and plausible, the acceptance is based on the best available evidence at a given point in time … If we were to accept a particular point of view as ‘certain’ or ‘infallible’ we are in fact saying that no amount of new evidence can ever lead us to change our belief. Such a view is not only obviously false, but clearly makes a mockery of the whole scientific enterprise. The commitment to true and valid knowledge is, therefore, not a search for infallible and absolute knowledge.”

This study needs to be seen in this light, i.e., as an ongoing search for an understanding of ECIS success. I am aware that this work does not end here, but is merely a platform for further inquiry. Checkland articulated this appropriately when he said:

“Oh obviously the work is not finished, and can never be finished. There are no absolute positions to be reached in the attempt by men to understand the world in which they find themselves: new experience may in the future refute present conjectures. So the work itself must be regarded as an on-going system of a particular kind: a learning system which will continue to develop ideas, to test them out in practice, and to learn from the experience gained”

(Checkland, 1986: xii).
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