eREADINESS AND eCOMMERCE SUCCESS: DEVELOPING AND EXPLORING AN ANTECEDENT MODEL IN DEVELOPING COUNTRIES CONTEXT

by

Alemayehu Molla - Adankew

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A Thesis Submitted

for the

Degree of Doctor of Philosophy in Information Systems

FACULTY OF COMMERCE

DEPARTMENT OF INFORMATION SYSTEMS

UNIVERSITY OF CAPE TOWN

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To my parents

Kebedech Woldu and Molla Adankew

መታሰቢያነቱ

ለእናቱ ከበደች ወልዱ እና ለአባቱ ሞላ አዳንቄው

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ABSTRACT

eCommerce is touted as offering developing countries unprecedented opportunities for economic growth and development. In addition, current wisdom maintains that developing countries' success in eCommerce will have an impact far beyond their borders in accelerating global productivity and facilitating global economy success. Therefore, understanding how eCommerce is accepted by businesses in developing countries and what affects its success are primary issues of interest for researchers, businesses, governments and development agencies.

The literature on IT, eCommerce, eReadiness and eCommerce success in developing countries has been examined and critiqued. The result reveals the environmental determinism view as a dominant perspective in most of the existing works and the lack of a theoretically sound model to explain and understand eCommerce success in developing countries.

Using a theoretically eclectic approach derived from organization science, information systems, competitiveness, innovation and institutional theories and based on an interactionism perspective, the study proposes a theoretical framework for eReadiness and eCommerce success with particular relevance to established businesses in developing countries. From the framework, a model relating nine organizational (awareness, commitment, governance and human resources, business resources and technological resources) and environmental (government, market forces and supporting industries) constructs of eReadiness and four facets of eCommerce success (adoption, development, deployment and benefits) is derived. An instrument to operationalize the model is developed and validated. The model is empirically tested based on data collected from a cross section of 150 South African businesses using multivariate statistical techniques. The result shows various blends of organizational and environmental eReadiness factors affecting the different facets of eCommerce success.

The key finding refutes the environmental determinism perspective that dominates eCommerce discussion in developing countries and supports the interactionism perspective. It is concluded that if we are to understand the emergence and development of eCommerce in developing countries we must depart from the conventional wisdom of looking into environmental constraints only and pay attention to internal organizational capabilities and characteristics as well.

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CHAPTER ONE

INTRODUCTION

INTRODUCTION

"The emergence of electronic commerce over the past decade has radically transformed the economic landscape. For developing countries, the digital revolution offers unprecedented opportunities for economic growth, as entrepreneurs from Bangalore to Guadalajara to Dakar will testify. On the other hand, countries that lag behind in technological innovations risk being bypassed by the competitive edge of those using the new technologies" (Kofi Annan IN *UNCTAD, 2001).*

1.1 PRELUDE

The cumulative impacts of Information and Communications Technologies (ICT) applications in the past few decades coalescing with other technological, social and economic adaptations are transforming, albeit unevenly, the way global society communicates, works, entertains, studies, and conducts business. The results so far are characterized as major 'strides' in the developed world and 'inroads' in the developing world (UNCTAD, 2001, Palvia et al, 1992). One of the recent outcomes of this ongoing ICT enabled transformational process is the rise and meteoric growth (in the number of businesses going online, the volume and value of sales, revenue and employment, sectoral pervasiveness, economic significance, 'social presence', popularity, etc) of electronic commerce (eCommerce).

eCommerce is touted as having the potential to transform the *modus operandi* and structure of business and business interactions at the individual, organizational, industry, national and regional levels in ways no other ICT application has done before (Tapscott et al, 1998; Drucker, 1999; Kalakota and Whinston, 1996, Wigand and Benjamin, 1995). For developing countries in particular, eCommerce is conjectured as offering 'unprecedented opportunities for economic growth and development" (UNCTAD, 2001) and "a chance not only to connect with the rest of the world but also to catch up" (EIU, 2001) by creating new opportunities, eliminating barriers and improving efficiency of businesses (CID/HU, 1999; UNECA, 1999; ITU, 1999). Nonetheless, some are less optimistic and express concerns that eCommerce might create a new world of "haves" and "have-nots" (WEC, 2000); "potentially marginalizable" economies and societies (Licker, 2001) and "freeze" and "squeeze" businesses in developing countries (Persaud IN The Economist, 2000).

Inevitably, the term eCommerce conveys different meanings for different people. For some, it is a new phenomenon that followed the commercialization and business applications of the

Internet in general and the World Wide Web in particular (Ferraro, 1998; Treese and Stewart, 1998). For others, it is as old as the era of the Telegraph and Telephone in the mid-nineteenth century; the proliferation of Automatic Teller Machines (ATMs) in the 1960s and Interorganizational Information Systems (IOS) including Electronic Data Interchange (EDI) in the 1980s (Senn 2000; Fellenstein and Wood, 2000; Wigand, 1997). Some associate eCommerce purely with the dotcom and startup phenomena (Korper and Ellis, 2000; Morath, 2000) while others include traditionally established but eCommerce-enabled (E-nabled) businesses as well (Deise, 2000; Zwass, 1996). A debate also exists on the distinction between the interpretations of eCommerce, eBusiness and eMarkets (Hartman et al, 2000; Hackbarth and Kettinger, 2000; Wigand 1997). The term eCommerce should therefore not form the basis of arguments about what eCommerce is and what it is not. Rather, the focus should be on the understanding of what the term is used to conceptualize in a particular research set up. This thesis mainly focuses on eCommerce on the Internet and on 'traditional business' settings that are 'E-nabling' their businesses.

In this chapter, the trend of eCommerce is briefly described and its implications for businesses in developing countries delineated. This leads to the questions that the research sets out to address, which will be followed by assumptions and the research approach. The contributions of the study are then highlighted and the chapter concludes with statements outlining the organization of the thesis.

1.2 eCOMMERCE: AN EPHEMERAL VOGUE OR A LASTING TRAJECTORY?

> *"E-commerce is to the Information Revolution what the Railroad was to the Industrial Revolution – a totally new, totally unprecedented, totally unexpected development. And like the railroad 170 years ago, e-commerce is creating a new and distinct boom, rapidly changing the economy, society and politics." (Drucker, 1999:50)*

The recent eCommerce shakedown gives another credence to the old adage that "*it is hard to make predictions, especially about the future*". Many exaggerated predictions of eCommerce and its touted impact on business practices are among the first fatalities of the dotcom boom. Following the crash and skepticism that seems to surround eCommerce investments, one will be forced to ask what the future holds for eCommerce or vise versa.

If Drucker's comparison of eCommerce quoted at the beginning of this section is to be accepted, then eCommerce should not be summarily dismissed as an ephemeral vogue, but

should rather be viewed as having a much wider impact and a trajectory very much like the printing and industrial revolutions (UNCTAD, 2001; Cohen et al, 2000; The Economist, 2000; Drucker, 1999). For example, the biggest winners from the 'railway boom' were small firms and farmers who benefited from the mobility that was made possible and not the 5000 or so railway companies that once burgeoned, of which only a little over one percent exists today (The Economist, 2000). The same is true of the more than 2000 car manufacturing companies. 99% of those car companies are no longer around (UNCTAD, 2001; The Economist, 2000).

Even if the mortality rate of the startups appears to be high, most established companies are still pushing ahead with various eCommerce initiatives and countries are continuing to adopt schemes to facilitate the wider diffusion of eCommerce (EIU, 2001; UNCTAD, 2001). In fact for established businesses, the choice appears to be 'eBusiness or out of business' (Barrenechea, 2001; April and Cradock, 2000).

The migration of established businesses to eCommerce is often associated with causing and/or requiring technological and organizational discontinuity. This is because traditional organizations are built to overcome the constraints "imposed by the tradeoff between richness and reach" and they have been "structured to accommodate that limitation" (Evans and Wurster, 2000: 194). Technologically, e-commerce entails organizations to move from a distributed client/server based or other similar systems to centralized and highly integrated internet based databases where everyone and every unit of the organization has easy access to "rich" information (Barrenechea, 2001; NNI, 1999). Organizational discontinuity, on the other hand, manifests in the course of the transformation of traditional business processes into eCommerce processes through unhealthy intraorganizational competition, unwillingness to change and impediments to integration (NNI, 1999). Hoque (2000) refers to these as "political obstacle" and urges that in order to be successful and achieve integration, organizations need to have the capability to navigate political issues.

However, most businesses embark on eCommerce in a haphazard way, perhaps on a "grow-wild" or "herd instinct" basis without assessing their capacity to cope with the discontinuities and other requirements of eCommerce (Hartman et al, 2000; Scheepers, 1999). In the words of Hartman et al (2000: 21)

> *"... the unvarnished truth reveals that most organizations have deployed e-business initiatives on an ad hoc, somewhat opportunistic basis insufficiently supported by the*

> *structural requirements to execute competently and have sunk unmeasured resources into e-business initiatives without seeing results anywhere near the returns they expected*"

Although it is *hard to make predictions about the future,* it can nonetheless be argued that notwithstanding the dotcom downturn, eCommerce is here to stay. For established businesses in developing countries, the most important lesson is therefore to analyze the opportunities and challenges of eCommerce, learn from the mistakes of the pioneers and minimize failures (UNCTAD, 2001). An early call by Montealegre (1996:148) reads

> *"Managers in developing countries are faced with great challenges and opportunities. It is their responsibility to ensure that their companies are prepared to compete in this new environment because it is here to stay. They cannot afford to ignore it. However, they cannot simply make fashionable investments for the company without making responsible and systematic analysis of its needs, its individuals and its environment. ... If managers fail to understand how to use [the emerging global information infrastructure], it will only create new barriers, limitations and foreign necessities in their societies."*

1.3 eCOMMERCE IN DEVELOPING COUNTRIES: HYPE vs. HOPE

Many prognoses of eCommerce in developing countries are inevitably characterized by speculative arguments at most and anecdotal evidences at best. The optimistic side of the argument, at the forefront of which are most of the multilateral development organizations, emphasizes on the opportunities that eCommerce unveiled for firms in the developing countries to easily access the global market and the range of benefits that would be expected to follow from such access (UNCTAD, 2001; The World Bank, 2001; UNECA, 1999; ITU, 1999; OECD, 1998). Some of these touted benefits could be summarized into four broad areas (or hypotheses).

eCommerce can eliminate barriers that stifled businesses in developing countries. In the era of increased internationalization of goods, labor and information markets (Wigand et al, 1997; Palvia et al, 1996), markets and more specifically access to markets remain one of the crucial problems of businesses in developing countries. The use of information and communication networks makes location-related constraints less influential and provides a better worldwide access to markets and market information (Wigand et al, 1997). It follows that using eCommerce, businesses in developing countries, irrespective of size and location, could overcome the geographical barrier of trading globally and access markets that would have otherwise been impossible to them. As a result, existing firms could be able to increase their

market 'reach'. For small businesses in developing countries that lack the wherewithal to participate in global market, such potential of eCommerce facilitates easier and cheaper entry to global markets. Notable anecdotes of such benefits are documented in ITU (1999) and UNCTAD (2001b).

The ease of accessing markets, in addition to increasing market "reach", would create new areas of opportunity for new businesses to flourish in developing countries (see Palvia et al, 1996: 77-104). For example, voice switching over the Internet has opened the global teleservice market for businesses in developing countries. Indeed, proponents of this argue that because of the relatively cheaper labor cost, developing countries might have a unique competitive advantage in some areas of the teleservice markets such as manning call-centers and data entry services. Some examples of these are documented in UNECA (1999) and UNCTAD (2001b).

eCommerce can eliminate (reduce) the middleman. This potential of eCommerce is founded on the disintermediation hypothesis. Disintermediation refers to the death (or gradual elimination) of the middleman (the intermediary) from the market value chain as organizations rely on the potential of electronic networks to establish direct linkages with consumers and suppliers (Wigand, 1997; Sarkar et al, 1995; Wigand and Benjamin, 1995). Using network applications, such as the middleware (Penbera, 1999) and electronic markets (Benjamin and Wigand, 1995), organizations can internalize activities that in the past have been performed by intermediaries (such as wholesalers, retailers, agents, distributors, brokers, warehousing operations, forwarders) and reduce the cost of the value chain. The transactional cost theory is an often-employed framework in the disintermediation context and proponents assume that market transaction costs can be reduced to zero and be eliminated by using networks (see Wigand and Benjamin, 1995; Sarkar et al, 1995). On the other hand, Evans and Wurster (2000) use the notion of "richness" and "reach" to make a case for disintermediation. According to Evans and Wurster (2000), intermediaries make their living from the trade-off between "richness" and "reach". If one considers the benefit of e-commerce, as Evans and Wurster (2000) succinctly argue, as blowing-off such tradeoffs, then there will be nothing left for the intermediaries- they will get blown-off as well.

Although the disintermediation impact of eCommerce on all types of intermediaries and in all types of industries is critically challenged (see for example Hartman et al 2000; Bakos, 1998;

Wigand, 1997; Sarkar et al, 1995), it is tenable to argue that networks enable organizations to bypass (even if not to completely eliminate) some intermediaries and reduce the producer-intermediary or the intermediary-consumer transaction costs. On the other hand, businesses in developing countries including those that are involved in agriculture often have to depend on long supply chains with a number of intermediaries in order to market their products and purchase required inputs. More often than not, the intermediaries take the lion's share of the profit; that they decide which products are to be delivered to the market and from which supplier to purchase equipment and other necessary inputs and that they add to the cost of input materials and finished products. As indicated above, eCommerce enables producers and/or consumers to bypass some of the intermediaries and/or the cost associated with them. Both end-users and producers are expected to benefit from such benefits of eCommerce as some of the savings are to be transferred to consumers in the form of reduced prices (for an example, see Kebede, 2000).

eCommerce can promote the efficiency of firms in developing countries. One of the costs that significantly affect an efficient performance of a business or any other economic activity is the coordination cost (Malone et al, 1989). Coordination costs include costs related in coordinating the activities of people and work and the costs of participating in the market (Wigand et al, 1997; Sarkar et al, 1995). They involve all information and communication related costs in determining the design, price, quantity and delivery schedule of a product (Benjamin and Wigand, 1995). In addition, they include the costs incurred in the "initiation, negotiation, completion, control and adaptation of a transaction relationship" (Wigand et al, 1997:19). Such coordination costs are also known as transaction costs and form the tenets of transaction cost theory (See Wigand et al, 1997; Sarkar et al, 1995).

Malone et al (1989) illustrate the advantages of electronic networks in lowering the coordination costs. They postulate that advances in information and communication networks improve the speed and cost of communicating the same unit of information and enable the design and deployment of strategic linkages among market players. It also facilitates an electronic market place where buyers and sellers easily compare offerings. This, in turn, leads to economic (efficient) utilization of resources required in coordinating activities and in reduced costs of transaction (Wigand, 1997, Malone et al, 1989). Wigand et al (1997) relate the above benefits of electronic networks to eCommerce and indicate that through eCommerce organizations would be able to achieve even cheaper unit cost of coordinating activities.

It has been argued that businesses in developing countries incur high costs in both production and coordination of their economic activities because of inefficient systems of procurement, communication, inventory control and operation (Mann, 2001). Such high costs normally add to the market price of products and affect the competitiveness of most developing countries businesses in the global market environment. Therefore, from the notion of the argument pursued above, it follows that through eCommerce, businesses in developing countries would be able to reduce the cost of coordinating the work of people and machines in all the "information, negotiation and execution phases" (Wigand et al, 1997) of their systems and increase their efficiency. In addition, through eCommerce, firms in developing countries would be able to reduce the transaction costs they would incur to participate in international trade and sell their products and services more easily and competitively.

eCommerce can contribute to economic development in developing countries. Following gains in efficiency and competitiveness, eCommerce is hypothesized to increase the productivity of firms in developing countries across the agricultural, manufacturing and service sectors creating employment opportunities and improving the overall level and quality of employment. The productivity gains are then expected to translate to better economic and social performance.

Empirical studies from developing countries to support or refute the above claims are scant. Nonetheless, one of the perplexing questions is that if IT in general and eCommerce in particular can contribute, perhaps arguably, to such benefits in the developed world why should it not produce the same result in developing countries? The other side of the debate raises the "digital divide" between developing and developed countries and its predicted persistence through the coming decades and argues that eCommerce and the Internet might further widen the gap between rich and poor nations. Persaud (in *The Economist*, 2000) stipulates three particular concerns:

> *The first is that the network externalities helping first-movers to establish a dominant position will favor American giants, so that local firms in emerging economies will be frozen out of e-commerce. The second is that the shift in power from sellers to buyers, which the Internet inevitably entails-the next supplier is never more than a mouse-click away-, will harm poor countries ... and poor-countries profit margins will be squeezed by rich-country firms. Lastly, high-tech shares in rich economies, have offered investors a much more attractive combination of risk and return than emerging economies, so poorer countries will enjoy less inward investment than they might otherwise have done (40-41).*

Of course, there are truths on both sides of the arguments. eCommerce is neither going to benefit all, nor are such benefits going to be uniform or positive (Licker, 2001; Licker and Motts, 2000). As much as eCommerce eliminates barriers, offers new opportunities, efficiency and productivity gains, it also brings increased danger of economic marginalization to countries and communities that cannot access it effectively. In the words of James D Wolfensohn, "*the potential of the digital world is as great as the danger of the digital divide*". The key questions for businesses in developing countries are not then who wins the academic arguments but rather how to learn from the mistakes of the pioneers and how to bring eCommerce from a possibility to a reality. If they succeed, the impacts are expected to go far beyond their borders to accelerate global productivity and facilitate global economy success (UNCTAD, 2001; McConnell and WITSA, 2000, 2001).

Nonetheless, the current literature on eCommerce in developing countries is highly speculative. Moreover, it appears to focus only on highlighting the multi-prong barriers of eCommerce in developing countries and mostly works from an *environmental determinism* perspective. Over the last two years, studies that attempted to investigate eCommerce obstacles in developing countries came in the form of e-readiness[1] studies. To date, most studies of e-Readiness primarily focus on the macro level constraints such as connectivity, access, network security, and regulatory environments with which firms located in developing countries must contend. Moreover, while on the surface every e-readiness assessment appears to measure the capacity of nations to participate in the digital economy, in practice, there is neither a consensus on the E-readiness being assessed nor are the tools (and the assessments that use one or the other tools) theoretically grounded.

Considering what in the first place led to the underdevelopment of developing countries, it may not be pragmatic to expect developing countries to address satisfactorily all the factors that

[1] When this study was proposed at the beginning of 2000, to the best of the author's knowledge, there were no known studies, especially focusing on developing countries, discussing the concept of E-readiness and that formed part of the motivation for the study. The first book-Net Ready- by Hartman, Sifonis and Kador came around April of 2000. Subsequently, the Asian Pacific Economic Cooperation, and the Center for International Development at Harvard University released guides for E-readiness assessment for developing countries and McConnell and WITSA produced their first E-readiness report covering 42 developing nations around and after mid of 2000. While the author started the study with the premise that no E-readiness study existed, that premise has to be revised at the time of writing the thesis in order to cover the literature proliferated since then. In addition, throughout this thesis, while ***'e-readiness'*** is used to refer to the concept as used in the existing literature, ***'eReadiness'*** refers to the conceptualization in this thesis.

existing e-readiness studies cover in the short to medium term. If they do, then they will no longer be called developing countries. Nonetheless, within the bounds of the prevailing policy, technology, human resources and legal environments, organizations in developing countries are implementing eCommerce and incorporating it into their operation (UNCTAD, 2001b). In fact, some do so in countries that can be considered archetypically "not" or "least e-ready" (Kebede, 2001; Bekele, 2000). However, existing literature on e-readiness does not provide us with full understanding of the eCommerce phenomenon in developing countries nor does it provide empirical implications of a country's e-readiness standing on the eCommerce initiatives of local businesses.

Moreover, the existing e-readiness literature, in addition to its lack of theoretical and empirical support, appears to work mainly from 'environmental determinism'" and "external influence' perspectives. Nevertheless, theories such as sociotechnical systems, system interactionism and innovation diffusion offer explanations that could lead to a position that in addition to external forces, internal organizational forces might also affect eCommerce in developing countries. So far, no study known to this author has investigated both theoretically and empirically how the internal organizational factors and external environmental factors contribute (or undermine) eCommerce and its success in developing countries at a firm level. In general, in relation to eCommerce and developing countries' studies the following limitations are observed:

- There is little empirical research on eCommerce in developing countries at the organizational level.
- Most existing studies emphasize on the potential of eCommerce for solving some of the problems of developing countries, often citing the leapfrogging argument, and focus mainly on identifying the weaknesses of the national context. However, substantive issues regarding organizations in developing countries and their ability and willingness to migrate to eCommerce are generally ignored.
- Existing studies also consist more of prescriptions and anecdotal descriptions without much thought to theory and analytical methods for studying the interplay between the environmental and organizational contexts.
- Theory development and conceptual frameworks identifying e-readiness and its effect on eCommerce and its success in developing countries are still in their infancy

Clearly, such gaps warrant a detailed study.

1.4 THE RESEARCH QUESTIONS

On March 31,2002, a Google search of the Web for 'e-readiness' OR 'e-commerce readiness' OR 'electronic commerce readiness' returns about 5290 hits (1614 on AltaVista). This is a phenomenal growth compared to only 10 hits of an Altavista search run on December 23, 1999. A hasty look of the above figures gives an idea of the body of knowledge, at least on the Internet, surrounding e-readiness. A critical look, however, reveals that what has proliferated is mostly assessment tools, of which no two are alike. There is a lack of consensus on the conceptualization of e-readiness and most of these tools are atheoretical. Moreover, studies that apply one or the other of these tools have primarily focused on the socio-technological and politico-economical analysis of the developing countries environment and, so far, no attention has been given to a firm level analysis of e-readiness. Overall, the existing literature does not convey a theory-based understanding of e-readiness. Hence, the first research question is:

> ***What is eReadiness, what are its dimensions and how can it be measured in developing countries context***

eCommerce success as a term is usually used. However, as a concept, it is unusually ill-defined. In particular, little is known on how to model and assess the eCommerce success of 'e-nabled" established businesses and none exists that can be considered as appropriate in developing countries context. Most existing criteria of success such as market capitalization, reach, usage, customer satisfaction, etc., have been criticized as inappropriate in the context of "a developing technology (the WWW), a developing business model (eCommerce) and a developing society" (Licker and Motts, 2000). In addition, some of these criteria such as market reach and capitalization do not appear to pass the test of the dotcom crash. Therefore the second question is:

> ***How can eCommerce success be conceptualized and operationalized in developing countries context?***

At the outset, the purpose of most e-readiness studies seems to identify the factors that affect various aspects of eCommerce success. However, except for an intuitive argument as to the existence of a positive (either necessary or sufficient) relationship, there does not appear to be an empirical study that investigated (demonstrated) such relationships at the firm level in general and in developing countries in particular. For example, the only work known to this author of that nature, by Hartman et al (2000) postulates that "net readiness" contributes to either the success or failure of eCommerce initiatives and "without net readiness, even the most inspired strategic initiative is doomed to flounder". However, Hartman et al do not

demonstrate the empirical relationship between their dimensions of "net readiness" and eCommerce success nor identify the critical components. This study takes the argument of Hartman et al further which leads to the third research question:

> ***What is the nature of relationship between eReadiness and eCommerce success in developing countries context?***

In addressing the above research questions, the study intends to explore the following general research hypothesis

> ***eReadiness explains a significant portion of the differences in the eCommerce success of organizations in developing countries***

1.5 ASSUMPTIONS AND APPROACH

The major unit of analysis in this study is the organization. The empirical data required for the study is, for the lack of a better term, "assessment (audit) data" of the organization and its environment and is to be collected mainly from business managers. The fundamental assumption in this exercise is that top-level business mangers in general and CEOs in particular are capable of providing a dispassionate assessment ("expert witness") of the components and attributes of their internal organization and external environment.

A second assumption is that the research intends to explore the research questions in developing countries context and collects empirical data from South Africa. According to The World Bank's (2001) classification, South Africa falls within the "developing countries" category. While we acknowledge the apparent differences amongst the developing countries, and the conventionality of the term "developing countries", no attempt will be made in this study to establish whether South Africa is a developing country or not and The World Bank's classification is assumed as valid and accepted without further investigation.

In the light of the main paradigms of information systems research, the research approach followed in conducting the study can be positioned within the positivist camp. The researcher remained by and large objective and detached in the investigation of the phenomenon under study and the research instrument was the primary means of contact with the data subjects. Using survey as a basic researching strategy, an instrument was developed and validated to collect empirical data. The research hypotheses were probed using multivariate statistical techniques.

1.6 CONTRIBUTIONS OF THE STUDY

The intended contributions of this study to theory and practice are manifold. First, it suggests a framework for understanding current eCommerce research. Second, it presents an extensive review of the literature on eCommerce, e-readiness and eCommerce success with particular reference to developing countries and establishes the gap in the existing body of knowledge. Third, through a critical analysis of the literature it brings to the surface the importance of both internal organizational and external environmental factors and argues that the fusion of these factors affects eCommerce success in developing countries. Fourth, it proposes a theoretically grounded framework for eReadiness within which to understand and assess eCommerce and various facets of its success in developing countries. Fifth, it tenders a valid and reliable instrument to operationalize the model. Sixth, it purports empirical support for the derived model. Seventh, it expands the position that the fusion of organizational and environmental factors (eReadiness) is necessary for various facets of eCommerce success in developing countries. Eighth, it provides a survey of South African businesses current and planned eCommerce implementations. Last, but by no means least, it identifies the key lessons for developing countries but particularly for South African businesses and policy makers.

1.7 ORGANIZATION OF THE THESIS

The thesis is structured into nine chapters, including this chapter. The next chapter suggests a conceptual framework that enables readers to have a better picture of developments in various levels of eCommerce research. The framework is then used to derive and support the eCommerce conceptualization and level of analysis the research adopts and addresses respectively. The framework is also used to guide the literature review exercise and helps to understand the kinds of research that have been conducted and are likely to be conducted in the future.

Against the above background, chapter three presents a critical review of the literature on ICT and eCommerce in developing countries, eCommerce in general, e-readiness and eCommerce success and highlights the gaps in the current body of knowledge. Chapter four draws on several organizational, environmental and institutional theories to offer theoretical conceptualizations of the key concepts of the study and proposes a preliminary model of eReadiness and eCommerce success. The constructs of the model are identified and preliminary hypotheses are suggested.

In chapter five, the research methodology used to gather the data and explore the research hypotheses is discussed. The chapter covers arguments and decisions regarding epistemological choice, basic research approach, sample design, instrument development and data collection and analysis procedures.

The findings and analysis of the study are reported in three chapters- chapters six, seven and eight. The psychometric properties (validity and reliability) of the instrument developed to collect the data are discussed in detail in chapter six, which also includes discussions of tests for non-respondent bias. Chapter seven follows this and offers the descriptive findings of the study in terms of the demographic details of the sampled organizations and the nature and extent of their current and planned eCommerce activities. Chapter Eight then presents and analyzes the data, tests the proposed research model and related hypotheses, discusses the findings of the study in comparison with the existing body of knowledge and draws conclusions.

Chapter nine summarizes and concludes the study. The research questions are revisited and the key findings of the study and the conclusions to be drawn are summarized in the form of answers to the research questions posed in the first chapter. In addition, the theoretical and practical contributions of the study are extracted. Some limitations of the study are outlined and rich avenues for future studies charted. Finally, the chapter ends with concluding remarks.

1.8 SUMMARY

This chapter introduced the topic by arguing a position that despite recent setbacks eCommerce will continue to prevail in the years to come. In particular, established businesses will continue to migrate to and embark on eCommerce. The lack of adequate theoretical frameworks to understand eCommerce in developing countries is highlighted and the three research questions the study will attempt to address outlined. The organization of the remaining part of the thesis is described, as are some of the assumptions and approaches of the investigation. The theoretical and practical contributions the study aims to accomplish are also listed.

In the next chapter a framework for understanding eCommerce and the trend and emphasis of Commerce research is presented.

CHAPTER TWO

A FRAMEWORK FOR UNDERSTANDING DIFFERENCES IN eCOMMERCE DEFINITIONS AND DEVELOPMENTS IN eCOMMERCE RESEARCH

LIST OF FIGURES

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CHAPTER TWO

A FRAMEWORK FOR UNDERSTANDING VARIATIONS IN eCOMMERCE DEFINITIONS AND DEVELOPMENTS IN eCOMMERCE RESEARCH

> *"The world is a text or script to be read and experienced. A framework is a pair of intellectual spectacles to see* [the world] *and a set of cubbyholes to display what you want to see" (Licker, 1999).*

2.1 INTRODUCTION

Since eCommerce is the key orientation of this thesis, it requires anchoring. Regardless of the "e" and "commerce" built into it, the term "eCommerce" has been conceptualized in so many different ways so much so that it is now almost difficult to use it in a neutral way. Researchers, guided by their conceptualization of eCommerce, have been investigating various issues in this "new phenomenon" of business and development. For example, at a special session of the 1998 International Electronic Commerce Conference in Bled, Slovenia, a group of 56 business and government leaders generated 174 research issues for eCommerce, ranging from highly technical to management-oriented topics (Bauer and Glasson, 1999). In a similar fashion, a survey of the ISWorld community at the beginning of 2000 by Benbasat, Ives and Piccoli identified 140 research questions, which were grouped into nine emerging eCommerce research areas spanning technological, individual, organizational, societal and economic issues.

In order to understand the differences in eCommerce definitions and the development and direction of eCommerce research, it is essential to have a robust analytical framework that helps in the "sense making and subsequent analysis" (Zwass, 1998). This chapter starts by reviewing various definitions of eCommerce and eCommerce research frameworks. It then proposes a comprehensive framework for developing a taxonomy of eCommerce definitions and understanding the development and future direction of eCommerce research. Using the framework, a working conceptualization of eCommerce to be used in this thesis is introduced.

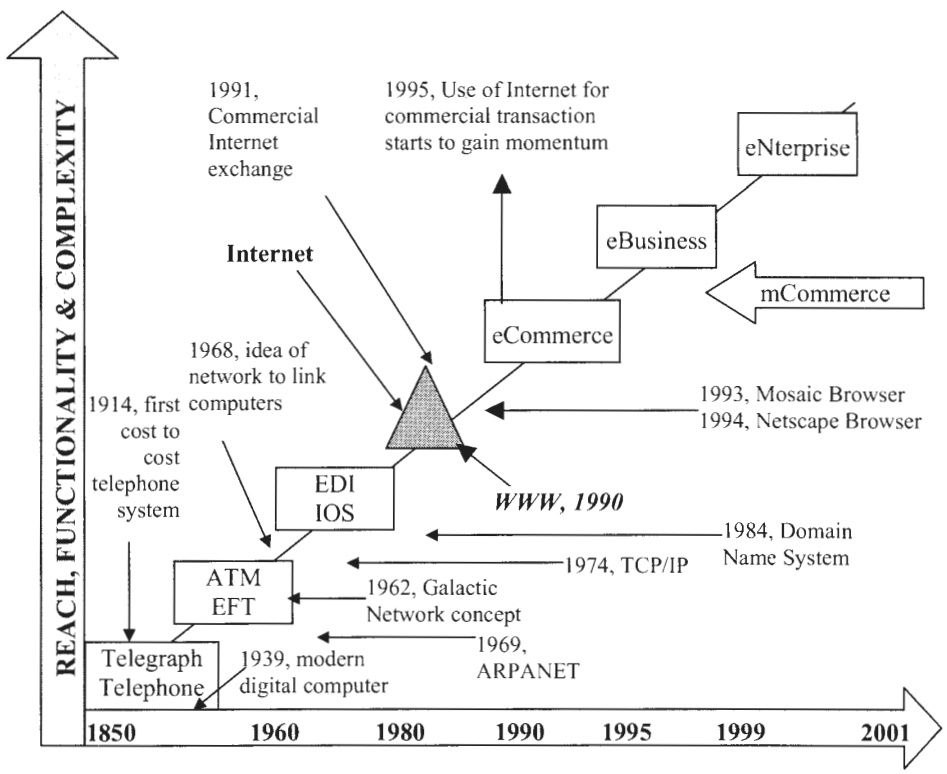
2.2 eCOMMERCE: FROM THE TELEGRAPH TO THE INTERNET

Arguably, the practice of conducting business using electronic mediums goes back as far as the era of Telegraph and Telephone in the mid–nineteenth century (The World Bank, 2001; OECD, 1999a). But more recently, it has existed since the 1960s when consumers were able to withdraw money from Automatic Teller Machines (ATMs) and make purchases using point of sale terminals and credit cards and businesses transferring payments through Electronic Funds

Transfer (EFT) platforms (OECD, 1999a; Wigand, 1997). This was followed by systems that traverse organizational boundaries to exchange data, information and business transactions electronically. Such systems were commonly known as interorganizational systems (IOS) (Senn, 2000; Kufman, 1966). The airline industry, with its sophisticated worldwide reservation systems, pioneered the early deployment of boundary-spanning information systems (Bauer and Glasson, 1999; Applegate, 1999).

Until the widespread deployment of Internet-based technologies in the early 1990s, enterprises that conducted electronic commerce used almost exclusively a highly secured and standardized form of computer-to-computer communication known as "Electronic Data Interchange" (EDI). In fact, the term "electronic commerce" was virtually synonymous with EDI (Fellenstein and Wood, 2000; Senn, 2000; Larsen and McGuire, 1998). eCommerce as such, however, has come to attract the interests of many pundits, policy makers and development agencies following the commercialization of the Internet and especially the advancement of the World Wide Web and its business applications. Hence, in the evolution of eCommerce, it is possible to differentiate between traditional eCommerce and Internet based eCommerce (Applegate et al, 1999; Wigand, 1997). Figure 2.1 provides a visual impression of this eVolution.

Figure 2.1 The eVolution



2.3 A REVIEW OF eCOMMERCE DEFINITIONS

There exist wide varieties of eCommerce definitions and conceptualizations covering a plethora of issues, technologies, application solutions, business models and parties. Multilateral and international institutions tend to maintain a very broad view of eCommerce such as doing business electronically (UN, 1997; EC, 1998). Such definitions appear to be very broad, generic and specify neither the network archetypes nor the business activities electronically supported and tend to include forms of electronic commerce that have existed since the era of the Telegraph. However, other institutional definitions of eCommerce such as OECD (1999a) and IMF (1997) specifically emphasize on the Internet and other similar networks that do not use proprietary protocols as a conduit for conducting business electronically.

While institutional definitions appear to be very broad, definitions from the academia are narrower and focused in terms of applications and business supports. Zwass (1996), for example defines, eCommerce as "the sharing of business information, maintaining business relationships and conducting business transactions by means of telecommunications networks". Others such as Korper and Ellis (2000), Bauer and Glasson (1999), Ferraro (1998) and Treese and Stewart (1998) take eCommerce as buying and selling goods and services through the Internet. Fellenstein and Wood (2000), Applegate et al (1998) and Wigand (1997) also support this view but understand eCommerce to include various processes within and outside the organization in addition to buying and selling activities.

However, Hartman et al (2000), Kalakota and Robinson (2000) and Hackbarth and Kettinger (2000) argue for a difference between eCommerce and eBusiness. In this line, while the first is defined as buying and selling over digital media, the latter is reserved for the next highest form and in addition to eCommerce includes both front and back office applications with a potential of transforming business relationships. Table 2.1 provides samples of eCommerce definitions from a wide variety of sources and comments on the differences in these definitions. The definitions were selected to include and represent a cross section of sources and views such as institutions, governments, consultants, textbooks and academic journals. The purpose was to highlight the scope and coverage of eCommerce definitions and motivate the eCommerce conceptualization to be followed in this study.

Table 2.1 Summary of Selected eCommerce Definitions

Author	Definition	Comment
United Nations (1997)	eCommerce is doing business electronically. This includes the sharing of various forms of business information by any electronic means such as electronic mail or messaging, WWW technology, electronic bulletin boards, smart cards, EFT, and electronic data interchange.	A very broad definition that considers a wide variety of network archetypes. It however highlights specific applications to be considered as eCommerce applications.
IMF (1997)	eCommerce is the business occurring over networks, which use non-proprietary protocols that are established through an open standard setting process such as the internet.	Emphasis on internet and other open system based networks. Not specific about the types of business functionality and specific applications.
European Commission (1997)	eCommerce is about doing business electronically. It is based on the electronic processing and transmission of data, including text, sound and video. It encompasses many diverse activities including electronic trading of goods and services, online delivery of digital content, electronic fund transfers, electronic share trading, electronic bills of lading, commercial auctions, collaborative design and engineering, online sourcing, public procurement, direct consumer marketing, and after sales services. It involves both products (e.g., consumer goods specialized medical equipment) and services (information services, financial and legal services); traditional activities (e.g., healthcare, education) and new activities (Virtual malls).	This definition does not specify the network archetype. It emphasizes (on) the information, physical goods and services transmission and transactions and extends eCommerce beyond and above buying and selling to include intraorganizational and traditional activities.
OECD (1997)	All forms of transactions relating to commercial activities, including both organizations and individuals that are based upon the processing and transmission of digitized data, including text, sound and visual images.	Focuses on the information transmission component of commercial activities but does not specify the network archetype, business functions and supporting applications.
WTO (1998)	eCommerce is the production, advertising, sale and distribution of products via telecommunication networks. Ecommerce can be divided into three broad categories for the purpose of policy discussion: (i) the searching stage where producers and consumers, or buyers and sellers first interact; (ii) the ordering and payment stage once a transaction has been agreed upon and (iii) the delivery stage.	Highlights the business functions that need to be supported electronically although it leaves the network to include all telecommunications networks. It also emphasizes commercial transactions.

US Department of Commerce (1999)	eCommerce is a business process which shift transactions on the internet or some other non-proprietary, web based systems. It is a means of conducting transactions that prior to the evolution of the internet as a business tool in 1995 would have been completed in more traditional ways-by telephone, mail, facsimile, proprietary electronic data interchange systems or face-to-face contact.	Considers Internet and other non-proprietary networks only but leaves open the types of applications, business functions and the transacting parties.
Wigand (1997)	eCommerce denotes the seamless application of information and communication technology from its point of origin to its endpoint along the entire value chain of business processes conducted electronically and designed to enable the accomplishment of a business goal. These processes may be partial or complete and may encompass business-to-business as well as business-to-consumer and consumer-to-business transactions.	Focuses on the application of ICT on the value chain without specifying the types of networks but highlights that business processes could partially be conducted electronically and still be considered as eCommerce. Also identifies the parties in the value chain.
Hartman et al (2000)	eCommerce is a particular type of business initiative that is focused around individual business transactions that use the Internet as medium of exchange, including business-to-business as well as business-to-consumer.	Distinguishes eCommerce from e-business, focuses on the net and defines the domains but leaves open the types of applications and business functions.
O'Brien (1999)	It encompasses the entire online process of developing, marketing, selling, delivering, servicing and paying of products and services purchased by internet worked global virtual communities of customers.	Considers only TCP/IP based networks and provides a generic list of business activities.
Bauer and Glasson (1999)	A general term for buying and selling of information products and services with the assistance of computer and telecommunications networks that use internet technology.	Focuses on internet based buying and selling and does not consider pre and post sale activities.
Kalakota and Robinson (1999)	ECommerce is buying and selling over digital media whereas e-business, in addition to encompassing eCommerce includes both front and back-office applications that form the engine for modern business.	eCommerce is narrowly treated and differentiated from eBusiness.
Treese and Stewart (1998)	The use of the global Internet for purchase and sale of goods and services, including support and service after the sale.	Refers to transactions where the Internet is used to gather information, order goods and services and make payments.

2.4. A REVIEW OF EXISTING FRAMEWORKS

As Table 2.1 shows, definitions of eCommerce given by various sources differ significantly. This translates into the kinds of eCommerce research that have been undertaken and are likely to be undertaken in the future. Earlier works have focused on developing frameworks and taxonomies that could help to explain the variations in eCommerce definitions and research (see for example Bauer and Glasson, 1999; Zwass, 1998, 1996; Riggins and Rhee, 1998; Wigand, 1997; Kalakota and Winston, 1996; Zwass, 1996).

Zwass (1996) provides one of the earlier works, which is further updated in Zwass (1998), to analyze eCommerce hierarchically. He suggests that the best way to conceptualize and analyze eCommerce is to consider it as a hierarchical structure composed of three metalevels: *infrastructure, services and products and structure.* Each of these levels allows a unique way of abstraction in that the lower ones deliver a well-defined functional support to the higher ones. The infrastructure metalevel represents the intermeshed network of wide-area telecommunications networks, extended by the metropolitan and local area public and private communication utilities.

The service metalevel consists of provision of secure messaging and other eCommerce support services such as publishing, payment, authentication, etc. The products and structure layer, on the other hand, covers the various systems and functions that organizations use to do business externally with their consumers and suppliers and internally among various units and include remote consumer services, electronic auctions, supply chain management, intranet applications, and on-line electronic marketing, etc (Zwass, 1998; 1996).

Zwass's work has popular support and subsequent works (Truman, 2000; OECD, 1999a; Bauer and Glasson 1999) use this framework to explain differences in eCommerce research and views. For example, the OECD working group on information economy proposes that existing eCommerce views differ in terms of their emphasis on (1) activities/transactions[1] (2) applications[2] and (3) communication networks (OECD, 1999a). The group further suggests that by taking into account what types of activity occur over which network, one could construct a typology of definitions and views describing eCommerce. Bauer and Glasson

[1] Activities/ transaction types refers to economic activities such as collaborative design, and engineering, commerce, transport, marketing, advertising, information services, settlement of accounts, health, and education,
[2] Applications were defined as all possible applications, eg., Web, Electronic Data Interchange, Minitel, etc.

(1999) also reflect similar views and identify three elements to any definition of eCommerce: "the concept of communication, the predominant communication enabling technology (Internet) and the business setting".

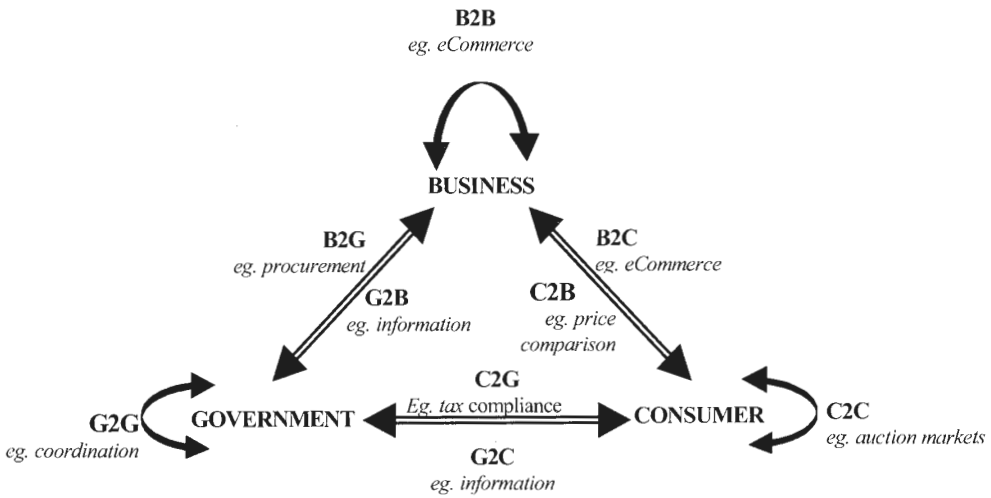
While Zwass's (1996) work seems to form the basis for most of the subsequent studies, some variations are also documented in the literature (see for example Riggins and Rhee 1998; Wigand, 1997). Wigand (1997) proposes a typology of eCommerce based on the degree of electronic interactivity that ranges from one-way teleshopping via cable and satellite TV to electronic shopping on the Internet and WWW, to full-fledged eCommerce using electronic market makers. On the other hand, Riggins and Rhee (1998) identify three classes of eCommerce applications: *business to customer, business to business, and intraorganizational* and suggest two basic dimensions along which eCommerce (internet based) views can be differentiated. These dimensions are *the location of the application user relative to the system firewall* (such as internal and external) *and the types of relationship* (technology enhanced and technology facilitated). By combining these two dimensions they propose to distinguish several uses of eCommerce. This might range from externally focused eCommerce with the objective of facilitating new business relationships (such as business to consumer and business to business) to intraorganizational systems with the purpose of improving coordination with internal business units.

One common theme that has emerged in the literature is the classification of eCommerce into business to consumer (B2C), business to business (B2B), business to government (B2G), consumer to consumer (C2C) categories. Although such classifications are commonly used, the literature appears to be inconsistent on what these classifications actually represent. Some (Riggins and Rhee, 1998; Applegate et al, 1996) consider such classifications as the top layer in the hierarchy of eCommerce metalevels. However, most of the existing eCommerce literature treats these categories as eCommerce models (Korper and Ellis, 2000; OECD, 1999; Tan et al, 1999; Kalakota and Robinson, 1999). A third variation refers to these categories as environments of eCommerce (Hartman et al., 2000) while some (Goldstein and O'Connor, 2000; Wigand, 1997) use them to indicate eCommerce market segments.

Nevertheless, by considering the three major players of the market, business, consumer and government, it is possible to have a variety of "eCommerce classifications" ("environments" or "market segments" or "models"). These include business to business (B2B), business to

consumer (B2C), business to government (B2G), consumer to business (C2B), consumer to consumer (C2C), consumer to government (C2G), government to business (G2B), government to consumer (G2C) and government to government (G2G). Figure 2.2 Provides a schematic representation of these different categories with examples (the examples are taken from Coppel, 2000). To date, major research progress has taken place in the B2B and B2C categories and as a result these two collectively represent what is meant by eCommerce in most of the existing studies.

Figure 2.2 Classification of eCommerce



The classification of eCommerce into several categories provides insight on understanding eCommerce and eCommerce research. However, considering such classifications as eCommerce models is too general, as it is possible to have a variety of eCommerce models that can be operated under each of the above categories. Nonetheless, the literature on eCommerce does not appear to have clarity on the usage of the term "business model" and authors often use the term without a proper definition (Timmers, 1998).

After considering different definitions, Timmers (1998) suggests a definition of a business model as "*an architecture for the product, service and information flows, including a description of the various business actors and their roles; the potential benefits for the various business actors and the sources of revenues*" (Timmers, 1998: 4). Although the above classifications of eCommerce as B2B, B2C, etc., indicate the role players, they do not satisfy Timmers's definition of a business model.

Various criteria are in use for identifying and describing eCommerce models. Timmers (1998) uses the *degree of innovation* (lower to higher) and *functional integration* (single to multi-function) and identifies a list of eCommerce models including e-shop, e-auction, e-mall, virtual community, third party market place, value chain integrator, etc. On the other hand, Bambury (1998) follows the dimensions of "transplanted" vs. "native" Internet businesses to identify a list of eCommerce models. Bambury's dimensions however are not entirely different from Timmers's (1998). Rather, they are related to the *degree of innovation* dimension of Timmers's (1998) work. In both cases, the criterion refers to the extent to which the eCommerce model is an extension of a traditional way of doing business or an entirely new function that does not exist before. While the former represents a *low degree of innovation* in Timmers (1998) and *transplanted real-world business* in Bambury (1998), the latter reflects a *high degree of innovation* and *native eCommerce models* for Timmers (1998) and Bambury (1998) respectively.

To date, Hartman et al's (2000) work is one of the most comprehensive works in eCommerce models. Hartman et al (2000) identify and extensively discuss five eCommerce models: e*Business storefront, infomediary, trust intermediary, ebusiness enabler, and infrastructure providers/communities of commerce.* Each of these models are described in terms of product offerings, target audience, activities, goal, and revenue stream. In addition, Hartman et al outline the basic competencies required in operating in each of the models. Table 2.2 summarizes the description of the models The eCommerce models described in Table 2.2 enrich our understanding of eCommerce and developments in eCommerce research. The models are not mutually exclusive and companies can implement them concurrently. However, of the five models described by Hartman et al (2000), eCommerce storefront (either in a B2B or B2C domain) is the most widely referred to model in the eCommerce literature.

In summary, although various attempts have been made to provide a framework to explain the variations in eCommerce views and research emphases, none of them appears to be sufficient on its own. While individually each contributed towards explaining some of the differences, so far, no framework that integrates the various dimensions discussed in the literature such as internal vs. external orientation, hierarchical layers, classifications and models appears to exist.

Table 2.2 Summary of ECommerce Models

	eCOMMERCE MODELS				
Criteria	**eCommerce Storefront**	**Infomediary**	**Trust Intermediary**	**E-business enabler**	**Communities of Commerce**
Definition	An entity in which commerce occurs, margin is created and value is extracted using existing as well as new digital market channels	An entity that brokers content, information, knowledge or experiences that add value to a particular E-business transaction, also known as content aggregator	An entity that creates trust between the buyer and the seller	An entity that provides a component or functionality and adjunct services to enable and lubricate other eCommerce storefronts or infomediaries	Members aggregated across a set of complementary interests and markets; communities of enterprises organized around common interest
Offerings	Products, services and content	Aggregation services, match making content and product and service fulfillment capabilities	Secure environment, escrow services, privacy, recourse, brands	Specialized functionality and products for e-business applications to support other eCommerce initiatives	Seamless infrastructure and maintenance, integration replicable framework and methodologies
Target Audience	Niche markets and buyers	Members of virtual community or a value chain and market segment	Buyers, sellers, affinity groups, community of interest (COIN)	E-business storefronts and infomediaries	COINs, service providers integrated in to a transaction
Activities	Provide stand-alone, network based products, services and content distributed in an E-conomy model	Aggregate buyers and sellers to facilitate transactions to be distributed in an e-conomy model	Provide an auditable environment in which informed consent may be determined, value may be exchanged securely and privacy maintained	Support the opportunities of e-conomy product and service providers by delivering a robust, reliable functionality	Aggregates information, technology, networking and brand/trust management to create a seamless infrastructure to support vertical markets
Goal	Dominate target market (niche)	Capture dominant mind share or share of transactions	Extract value from each transaction by enabling a safe, secure transaction environment	Extract value from each transaction by aggregating interested, willing prospects with merchants	Extract a piece of the new value created by providing infrastructure supported by value adding aggregation
Revenue Stream	Product/service margin and advertising	Advertising, subscription fees, partnership fees, percentage of transaction fees	Licensing fee, subscription	Licensing fee partnership fee, percentage of transaction	Advertising, subscription fees, partnership fees, percentage of transactions
Examples	Amazon, Dell , Cisco, E*Trade	NetBuy, Autobytel.com, E-Loan	Verisign, CyberCash	Federal express, Loopnet	The Sabre Group

(Source: Based on Hartman et al, 2000: 101- 141)

2.5 BUILDING THE FRAMEWORK

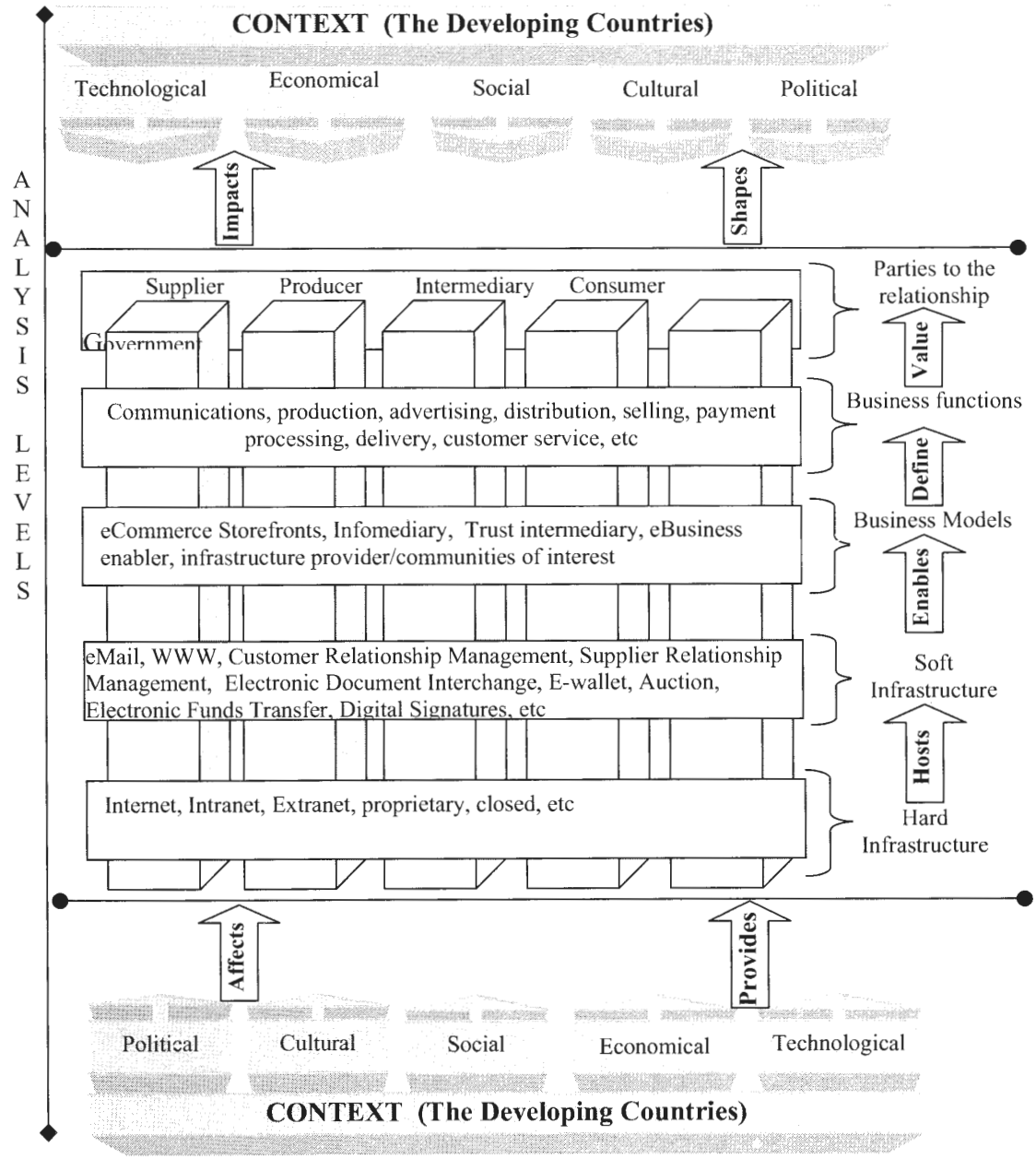
The discussion hitherto indicates that there are various levels of defining and investigating eCommerce. These range from the technological level moving through the different application solutions, business models and functions up to the levels of business organizations, consumers and government and the macroeconomy as a whole. This study, through analyses and syntheses of existing eCommerce definitions and previous analytical and conceptual frameworks for understanding eCommerce and eCommerce research, proposes a quasi-hierarchical framework for understanding the differences in eCommerce views of researchers and the past efforts and future directions of eCommerce research.

The framework is based on works proposed by Molla and Licker (2001), Zwass (1998; 1996,) Kalakota and Whinston (1996). It identifies six levels: network archetypes (hard infrastructure), application solutions (soft infrastructure), business models, business functions, the parties involved in electronic relationships and macroeconomy within the socio-cultural, politico-economical and technological contexts of a given country or region. Figure 2.3 lays out a schematic representation of the framework.

Network archetypes represent the electronic infrastructure that provides the backbone for the soft infrastructure supporting eCommerce. Network archetypes could be classified as proprietary and non-proprietary (O'Brien, 1999); open vs. closed (Bauer and Glasson, 1999) traditional vs. Internet based (Applegate, 1999) intranets, extranets and Internets (Riggins and Rhee, 1998). Application solutions, on the other hand, refer to software products and services that run over the hard infrastructure and make it technologically feasible to build business models and perform business functions electronically. These include electronic messaging, electronic data interchange, electronic payments, electronic publishing, enterprise applications and security applications (Treese and Stewart, 1999; OECD, 1999a; Kalakota and Robinson, 1999; Barua and Whinston, 1999; Kalakota and Whinston, 1996).

Business models indicate the way parties to electronic relationships propose, deliver and exchange values (refer to Table 2.2). In a similar fashion, the value adding business functions can be viewed from an organizational or consumers end points and involve the three generic functions of pre transaction (discovery), transaction and post transaction (services) (Fellenstein and Wood, 2000; OECD, 1999a). From the organization's (service or product provider) side

Figure 2.3 A Framework for Understanding Directions in eCommerce Research



these activities and processes involve *market/product research, designing, market stimulation, terms negotiation, order receipt, order billing, order delivery, customer service and support* whereas from the service receiver (customer) side the functions include *product discovery, evaluation, ordering, payment, product receipt and product service and support* (Fellenstein and Wood, 2000; OECD, 1999a).

On the other hand, the parties to the electronic relationship could be segmented as internal and external on the basis of the hypothetical boundary of an organization. In a similar fashion, by

taking into consideration the location of the main eCommerce user and application relative to the organizational boundary, we could have intraorganizational and interorganizational eCommerce (Riggins and Rhee, 1998). Intraorganizational eCommerce facilitates the business functions within the organization while interorganizational eCommerce enables the organization to do business with members of the value chain. The members of the value chain could be other business organizations (suppliers, distributors, creditors, etc), the government and its different arms and consumers. The context level refers to the analysis of the context to facilitate eCommerce technologies, application solutions, business models, business functions and relationships and the impact of eCommerce on shaping the context.

The framework helps getting a clearer understanding of eCommerce definitions researchers work with while at the same time allowing the formulation of working definitions with clear inclusions and exclusions. For example, some of the definitions in Table 2.1 refer to only one business model and function (such as storefront) or to one business model and function occurring over a particular application and network archetype (for example, Web based storefronts occurring over the internet to support buying and selling activities) or more narrowly to one business model and function occurring over a particular application and network archetype between a defined parties (for example Web based storefronts occurring over the Internet to sell products by a business to individual consumers). Therefore, using the framework it is possible to build taxonomy of eCommerce definitions and to reach a shared understanding about the areas covered by specific research endeavors.

Moreover, the framework facilitates identifying eCommerce research issues at different levels, formulating research questions appropriate at each level, and choosing relevant theories and analysis tools applicable to the level of interest. This understanding will give eCommerce researchers a starting plank to research eCommerce and make relevant recommendations to the world of practice specific to the chosen level of analysis. The framework can also be used to highlight the challenges eCommerce researchers have to address in investigating eCommerce at various levels and how their scope of research and their definitions of eCommerce could vary. Furthermore, the framework is durable overtime and will not be affected by newly emerging technologies (hard or soft) and business models. Rather, in view of relevant theories, it allows identifying and classifying research issues as new technologies and practices emerge.

2.6 CONCEPTUALIZING eCOMMERCE

Based on the previous discussions, it can be claimed that the term eCommerce should not form the basis of arguments on what it is and what it is not; or whether it is different from eBusiness or not. Rather the focus should be on the conceptualization that goes behind the term in a particular research set up. Using the framework in Figure 2.3 it is now possible to introduce a working definition of eCommerce to be used in this study and the level at which the study investigates eCommerce.

For the purposes of the analysis to follow, eCommerce is defined as conducting one or more of the business functions internally within the organization and externally with suppliers, intermediaries, consumers, government and other members of the extended enterprise by adopting one or more of the business models that use World Wide Web based application solutions running over the Internet and Internet based networks.

This study primarily focuses on established organizations, rather than Internet-only business settings. The intention is to investigate what affects the success of the established businesses' migration to eCommerce. The focus is on the businesses' transition and use of eCommerce and its success in the context of developing countries. The level of analysis is therefore, the organization and the issues that emerge as it deploys (or attempts to) the hard and soft infrastructures to support its business models in the course of successfully developing, generating, proposing, delivering and exchanging value; internally among various units and externally with members of the extended enterprise in the context of developing countries.

2.7 SUMMARY

This chapter established the need for looking into the variations in eCommerce definitions and developments in eCommerce research through a framework. A summary and review of some of the existing eCommerce definitions and eCommerce research frameworks were provided. The chapter proposed and explained a six level quasi-hierarchical framework that can be used to promote common understanding of the various definitions of eCommerce and the past and future research directions. Using the framework, a working definition of eCommerce is introduced. With this background, the next chapter reviews the literature on developing countries and ICT in general and eCommerce in particular, on eCommerce benefits and barriers, on eCommerce migration paths on e-readiness and eCommerce success.

CHAPTER THREE

LITERATURE REVIEW

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CHAPTER THREE

LITERATURE REVIEW

> *"The research on the implementation of IT in developing countries* [is] *sketchy, fragmented and sometimes ambiguous... Most of the studies have focused on conditions rather than actions and behaviors, and on weaknesses rather than on ways of overcoming them. ... The studies consist more of prescriptions than of descriptions. The descriptive studies concentrate mostly on showing the weakness of the contextual factors of IT. ... And a further difficulty of many of these studies is the lack of comprehensive underlying theory" (Montealegre, 1999b:200-201).*

3.1 INTRODUCTION

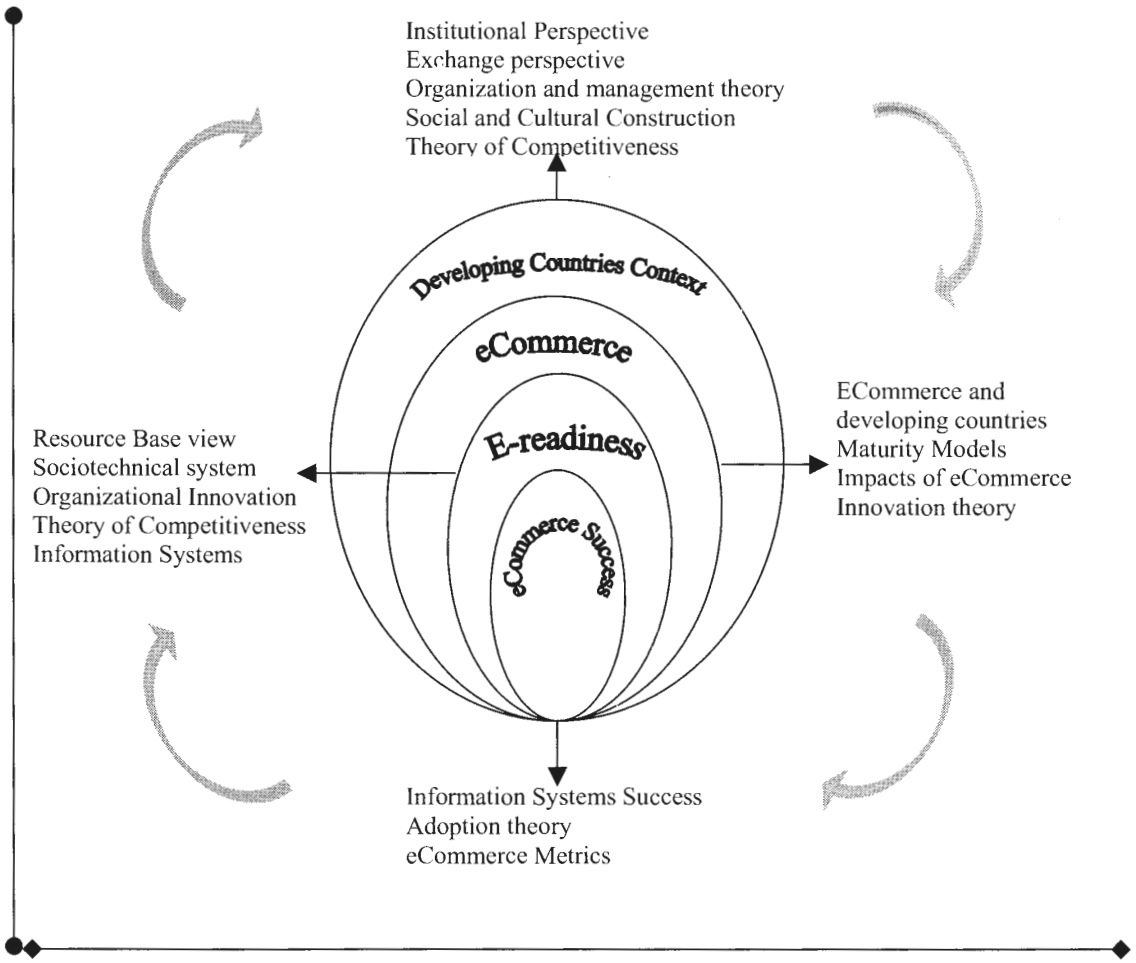
The above excerpt has more than a grain of truth in it. Indeed, it eloquently expresses the state of research on IT in developing countries. The picture is even gloomier when one looks into the literature on eCommerce and developing countries. Ideally, the research questions introduced in the preceding chapters require a review of pertinent past studies of eCommerce in developing countries. Unfortunately, such studies are scarce and one has to draw from other related areas and disciplines in order to place the current study within the existing body of knowledge.

eCommerce is an emerging field without accepted paradigms or well-defined sub-fields. It is cross-disciplinary in its conduct and multi-disciplinary in its roots (Bauer and Glasson, 1999). It involves a myriad of issues from a variety of disciplines such as law, information systems, organization and management sciences, economics, marketing, computer science, etc. Therefore it might not be tenable to investigate eCommerce from a single theoretical perspective (see for example Wigand, 1997). Central to this study, however, are the concepts of E-READINESS and eCOMMERCE SUCCESS and their relationship within the context of DEVELOPING COUNTRIES. To do justice to the literature, it was essential to span works and theoritical perspectives from the disciplines just mentioned.

This chapter starts by examining the literature on ICT in developing countries. It then moves to reviewing the literature on eCommerce in general and in developing countries in particular. In line with our emphasis on established businesses, previous eCommerce studies that deal with eCommerce migration paths, benefits and barriers are sought out and their findings discussed.

The review also covers the e-readiness and eCommerce success literature. Figure 2.1 highlights the areas that the literature review has attempted to address either in this or subsequent chapters. With respect to the current study, the chapter concludes by summarizing the findings of the literature review in terms of what is known and what is yet to be known. The literature review forms the scaffolding for building the main thrust of the paper in the next chapter.

Figure 3.1 A Classificatory Framework For The Literature Review



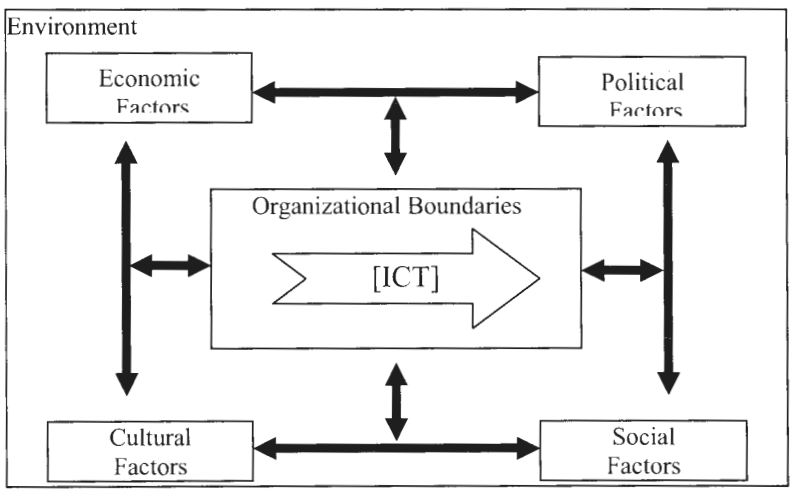
3.2 UNDERSTANDING THE DEVELOPING COUNTRIES CONTEXT

3.2.1 Relevance

The term "developing countries" conventionally refers to more than 150 low-income and middle-income economies (The World Bank, 2001). Inevitably, it does not imply that all economies in this group are at the same stage of development nor does the classification reflect actual development status (The World Bank, 2001). In this study, the developing countries

context is conventionally used to describe the interplay of the prevailing social, cultural, political, economic and technological environment of the countries in this group (see Figure 3.2 adapted from Al-Abdul-Gader, 1999). This context is, however, highly elusive. Social, economic and cultural differences are too pronounced among the so-called developing countries to allow for a uniform analysis (Austin, 1990; Palvia et al, 1996). Some developing countries are striving to build up manufacturing and industrial capabilities, moving from the predominance of the agricultural sector; others are in the midst of a transition from the industrial to the service economy; yet others are undergoing a transformation from a planned to a market economy. Moreover, some developing countries demonstrate a microcosm of developed and developing countries, South Africa is a classic example. Hence, for the sake of pragmatism and to minimize the peril of gross categorization, the discussion, here, will mostly emphasize on the African countries.

Figure 3.2 Environmental Factors and [ICT] Diffusion



(Source: Al-Abdul-Gader, 1999)

Almost all of the primary innovations are taking place in the developed West leaving the developing countries as importers and secondary innovators (acquisition, imitation, adaptation, etc) (Corea, 2000; Deans and Karwan, 1994). Since the late 1960's, the appropriate technology (AT) movement addresses problems caused by such technology transfer to lesser-developed countries (Palvia et al , 1992). AT scholars argue that technologies shipped to the third world without customizations are too costly, unsuitable and socially disruptive (Palvia et al, 1992). Even if the AT school with its tradition of prejudices against high-tech solutions and innovative systems for developing countries fails to provide comprehensive and timely

answers to the dilemma of developing countries, it however, identifies the importance of understanding and considering the social, economic, cultural and political context of developing countries in technological transfer.

Although an understanding of the context within which ICT innovations (including eCommerce) are initiated, developed, transferred, implemented, used and assimilated is equally relevant to developed as well as developing countries, it is probably more important in developing countries where the environmental constraints are often compounded, pervasive, severe and far reaching (Corea, 2000; Al-Abdul-Gader, 1999; Montealegre, 1997; Munene, 1995). Most studies that address the developing countries' context appear to highlight the differences between developed and developing countries in terms of social, cultural, economical, technological, human, etc., aspects and call for the consideration of these differences in the implementation of technologies and innovations (Montealegre, 1999b; Montealegre, 1999a; Morales-Gomez and Melesse, 1998; Jarvenpaa and Leidner, 1998; Avgerou, 1998; Munene, 1995; Lambert, 1995; Bhatnagar and Odreda, 1992; Munasinghe et al, 1985) and the development of IT/IS implementation and management models specific to the realities of developing countries (Al-Abdul-Gader, 1999; Lehman, 1996; Lind, 1991; Austin, 1990; Palvia et al, 1990). It is conjectured that an understanding of these issues facilitates better implementation of and results from ICT.

3.2.2 Determinants Of The Developing Countries' Context

Culture is probably one of the chief contextual factors that have been the subject of many studies dealing with ICT in developing countries. In this line, most studies seem to work with the thesis that the implementation and use of technologies and management and administrative models is influenced by cultural variations (Straub et al, 1997; Bijker et al, 1987).

Hofstede (1980, 1991) provides one of the most widely quoted classifications of national cultures on four dimensions; *individualism, power distance, uncertainty avoidance and masculinity vs. femininity*. Even if some (Avison and Myers, 1995; Jordan and Berry et al IN Walczuch et al, 1995) question the reliability and validity of Hofstede's classification of national culture, to date, no other study has emerged with an alternative framework to investigate cultural differences. An interesting phenomenon in Hofstede's classification of national culture is the differences in the position of developing African and developed countries on some of the dimensions. On the basis of Hofstede's classification, it appears that

developing African countries such as Ethiopia, Kenya, Tanzania, Zambia, Ghana, Nigeria and Sierra Leone are characterized by *collectivist*, *high power distance* and *high uncertainty avoidance* attributes, which are the exact opposites of most developed countries such as the USA, UK, Canada, Finland, Sweden, Australia, etc (Hofstede, 1991).

Although Prah (1990) and Bijker et al (1987) warn that arguments of culture often run the risk of "cultural egocentrism", implying the superiority of Western culture over the developing world's culture in light of information technology and other innovations, cultural differences between developing and developed countries are touted to have implications on the adoption and use of technologies (Straub et al, 1997), privacy and data protection legislations (Walczuch et al, 1995), management and control practices (Austin, 1990) and administrative models (Kiggundo, 1983). In addition, cultural differences are premised to influence technology transfer (Kedia and Bhagat, 1988); perceived sources of valued and trustworthy information and preferred forms of communication (Jarvenpaa and Leidner, 1998). Organizational structure (Schneider and Meyer 1991; Hofstede, 1980), forms of organizational relationships (Vreede et al, 1999) and innovativeness and risk taking (Jarvenpaa and Leidner, 1998) are also claimed to be sensitive to cultural differences.

For instance, Jarvenpaa and Leidner (1998) suggest that *collectivist* cultures tend to develop extensive personal and professional networks and tend to create resistance to accepting information from sources that are not personally known. On the other hand, whilst *individualistic* cultural values are related to the adoption of privacy legislation, societies that do not accept an *unequal distribution of power* might be inclined to enact data protection legislation (Walczuch et al, 1995). This would definitely have an impact on the adoption and use of eCommerce, which is an electronically mediated relationship where anonymity governs some part of the interaction and which also requires active legislative frameworks to protect consumers' privacy and data. In a similar vein, *uncertainty avoidance* is associated with more centralized and formalized organizational structure (Schneider and Meyer 1991; Hofstede, 1980) and an orientation towards the past (Schneider and Meyer, 1991; Jarvenpaa and Leidner, 1998). Obviously, this tendency might result in a strong sense of hierarchical relationships, where top managers run most of the scène (Vreede et al, 1999). It might also prevent innovativeness, as maintaining rather than disturbing the status quo tends to be a highly favored choice (Jarvenpaa and Leidner, 1998).

While most of the literature on culture, ICT and developing countries focuses on the influence of the cultural characteristics of developing countries on ICT, a few take the reverse issue. Morales-Gomez and Melesse (1998) warn of the invasion and possible extinction of the developing world's culture by the tide of Western values and attitudes introduced by ICTs. The Yir Yoront society, an Australian aboriginal tribe reportedly destroyed by technology (Delisi, 1990), is often used as ammunition to substantiate arguments of how technology can endanger indigenous cultural values. The development of Television and more recently the Internet and the extant content that dominates these mediums have also shed new lights on the gravity of the cultural challenges of ICT to the cultural identity of developing countries (Gomez and Melesse, 1998) perhaps leading to what Rifkin (2000) calls "new forms of cultural capitalism".

In general, from the above discussion it can be surmised that the literature on culture, ICT and developing countries is still fuzzy. Moreover, in the IS literature, little is known beyond Hofstede's school of thought (Molla, 1999). This echoes the call by some researchers to use a "*contemporary anthropological view of culture*" to better understand the interplay between culture and IT- how IT affects or mediates organizational and national cultures and vice versa (Avison and Myers, 1995).

Another determinant of the developing countries' context is related to the political environment. The political environment of most developing countries especially the ones in Africa is very dynamic and is characterized by upheavals (Kasongo, 1993). In fact, it will not be an overstatement if it is to be argued that in the African context, political stability is the *sine-qua-non* of everything (Molla, 2000b). Political stability in developing countries is considered as one of the most crucial environmental factors affecting the diffusion of computer based information systems (Al-Abdul-Gader, 1999), the development of the ICT industry (Jarvenpaa and Leidner, 1998; Raman and Yap 1996), continuity and efficacy of national ICT plans (Kasongo, 1993; Diakitie, 1991), overall competitiveness (UNDP, 2001) and sources of change (Jarvenpaa and Leidner, 1998). While many "Western models" of adoption and diffusion of innovation are based on the assumptions of stability (Munene, 1995) and technologically induced changes (Jarvenpaa and Leidner, 1998), changes in developing countries are often due to large societal and economic upheavals such as the overthrow of a government (Jarvenpaa and Leidner, 1998) and necessitate more dynamic models (Davis IN Palvia et al, 1992; Lehman, 1996; Austin, 1990).

Besides stability, developing countries' political context is often marked by heavy-handed government influence over industries and organizations, which affects ease of accessing certain resources (Montealegre, 1999b; Munene, 1995). This leads to government favored business groups ("party businesses" as Ethiopians would like to refer to them) to exercise disproportionate power in the market and manipulate the rules of competition making the competitive game unclear and unstable (Montealegre, 1999b). On the other hand, developing countries governments' commitment to ICT motivates or de-motivates certain decisions and courses of action (Montealegre, 1999a; Heeks, 1998a; King et al, 1994). Government involvement and its role in influencing and regulating both the demand and supply sides of ICT are documented in Molla (2000a), Wong (1998), Raman and Yap (1996), Adam (1996), and King et al (1994). Although it is difficult to establish causality between the involvement of the government and success in ICTs, the role of the state in promoting ICT diffusion and development cannot nevertheless be downplayed. However, in most of the African countries, there is a clear lack of national vision and leadership on ICT issues (Molla, 2001a; UNECA, 1999b; Adam, 1996).

The socio-economic and technological elements, which together can define the capacity of developing countries, are also other sources of variation from the developed West. Most Western based development and innovation adoption models appear to assume that adequate capacity, that can be mobilized as effectively as possible, is available in the target environment (Vreede et al, 1999) and tend to ignore the environmental factors that are so influential in less developed countries (Al-Abdul-Gader, 1999; Austin, 1990). However, developing countries in general and African countries in particular have limited capability in terms of market, human capital, telecommunication infrastructure, physical infrastructure, and legal and regulatory frameworks (Al-Abdul-Gader, 1999; Boer and Walbeek, 1999; UNECA, 1999; Vreede et al, 1999; Munene, 1995; Odedra et al, 1993). Therefore, the literature argues, it is no surprise that many models that ignored such forces have been found to have a poor fit to the developing countries (Al-Abdul-Gader, 1999; Austin, 1990) and ICT implementations that failed to consider these forces end in some sort of failure (Grundey and Heeks, 1998; Bhatnager and Odreda, 1992) without leading to the desirable benefits of economic development (Avegarou, 1998).

In general, Jarvenpaa and Leidner (1998) after reviewing the literature on the implementation of information technology in developing countries underscore that:

"although specific obstacles are different from one country to another, several common themes emerge. First, the government often controls or exercises influence over technology development and information industries. Second, there is a scarcity of managerial, technical and/or financial resources to implement IT innovations so crucial for the information industry. Third, the inadequacy of information infrastructure prevents network-based technology options. Lastly societal culture, the economics of labor versus technology and political instability might totally eliminate any benefits from IT investments and make information a non-valued asset" (345-346).

A summary of the discussion undertaken thus far is presented in Table 3.1.

Table 3.1 Summary of the Literature on ICT and the Developing Countries Context

Determinant	References	Remark
Culture	Hofstede (1980, 1991)	Classification of national cultures
	Austin (1990) Avison and Myers (1994) Straub et al (1997) Kiggundo (1983) Kedia and Bhagat (1988) Odedra (1992) Schneidari and Mayer (1991)	Cultural differences between developed and developing countries are premised to have implications on the transfer, adoption and use of ICT and other innovations, hence such differences need to be taken into account in ICTs implementation and transfer.
	Morales and Melesse (1998) Rifkin (2000)	ICTs threaten the cultural identity of developing countries.
Political Instability	Al-Abdul-Gader (1999) Austin (1990) Kasongo (1993) Lehman (1996) Palvia et al (1992)	In order to better understand the adoption and diffusion of ICT in developing countries, dynamic models that consider political instability are required.
Role of Government and other Institutions	Adam (1996) Heeks (1998) King et al (1994) Moila (2000a) Wong (1998) Raman and Yap (1996) UNECA (1999b) Montealegre (1999b)	Institutions in general and government involvement in particular could have a significant positive impact on ICT adoption, use and development in developing countries. However, the nature, level and extent of government involvement are still ambiguous and at times such involvement might tend to produce an adverse effect.
Socio-economic and technological	Alemna (1999) Avegarou (1998) Bhatnager and Odedra (1992) Lambert (1995) Odedra et al (1993)	The developing countries' context is characterized by limited capabilities in terms of market, human capital, telecommunications infrastructure and legal and regulatory frameworks and ICT implementation models and research need to take such differences into account.

Empirical studies of the impacts of the developing countries' context on ICT or vice versa as indicated in the quote at the beginning of this chapter are scant and limited in coverage. Table 3.2 provides examples of empirical studies that address environmental factors in the investigation of IT in developing countries. The studies are summarized to indicate the methodology used, the focus of the research, the context variable addressed and key findings.

A critical analysis of the literature summarized in table 3.2 reveals a number of limitations. In addition to the limitations cited by Montealegre (1999b) and quoted at the beginning of this chapter, the following shortcomings are noted in the existing empirical studies.

First, the studies suffer from a limited repertoire of variables often isolating their scope of investigation to culture or infrastructure issues while precluding the rest. Second, the analytical methods for studying the interplay between the context of developing countries and organizations are limited. Third, there is a weak link between the empirical research frameworks and relevant theoretical perspectives. Fourth, the geographical coverage of the studies is skewed to Asian and Latin American countries and there is little research reflecting the experiences of African countries.

Further analysis of the empirical studies summarized in Table 3.2 also reveals two emerging themes, one dominant and another minor, on the relationship and direction of influence between the environment and individual organizations. Most of the studies appear to work from the premise that organizations in developing countries have to adapt themselves and their IT practices to the demands of the local context. However, a few studies (Jarvenpaa and Leidner, 1998; Barrett and Walsham, 1995 and Montealegre, 1994) depart form this dominant wisdom and promote the notion that innovative and resourceful managers can shape and influence their environment rather than simply react to its restrictions in order to secure advantages from IT. These themes reflect how researchers treat the interface of organizations with the environment. Different theoretical perspectives from management and organization science ascribe different roles to the environment. The next section will provide a brief review of the literature that offers theoretical explanations and perspectives on the relationship between the environment and organizations.

Table 3.2 Examples of Empirical Studies on IS/IT in Developing Countries

Reference	Methodology	Focus of the Study	Component of Context Referred to	Key Finding
Nidumolu and Goodman (1996)	Interpretive	Implementation of Egypt's Cabinet Information and Decision Support Center (IDSC) project	Economic and Political	Political leadership and championship have significantly contributed to the successful implementation of IDSC
Boer and Walbeek (1999)	Survey and case study	Identify "bottlenecks" of the application of telematics in Bangladesh, Burkina Faso, Costa Rica, Ethiopia, Peru, &Zimbabwe	Regulation, Infrastructure, economic and socio-cultural	Regulation and infrastructure affect level of technology application. In addition, economic and socio-cultural situation have a large impact on using telematics.
Galliers et al (1998)	Case Study	Using Stages of growth model to study IS implementation in Karachi Development Authority (KDA)	Culture and political stability	Political instability results in frequent change of project managers and contributes to the delay of KDA project. Cultural characteristics influenced initial adoption but stages of growth model does not consider such issues
Hassan (1998)	Case Study	IT Industry Development	Role of Government, Infrastructure, people and economic maturity	Lack of telecommunication facilities and reliable and cost effective access to internet, lack of government policies and legislation, and financial institutions affect the development of IT Industry.
Jarvenpaa and Leidner (1998)	Case Study	Investigate an information company in Mexico using resource based view	Political Instability Infrastructure Culture	The ability of local managers to shape their external environment was a key success factor to pioneering an information industry.
Jayasuriya (1999)	Case Study	Using contextualist framework, analyze an implementation of a computerized health information systems	Infrastructure, culture	Cultural and environmental values need to be understood in adopting models and procedures used elsewhere when managing information systems in developing countries
Lind (1991)	Case Study	An Egyptian company's experience in the implementation of a ready-made computerized production	Culture	The implicit assumptions regarding rationality behavior and practice embedded in the system were found to be inapplicable in the Egyptian context.

		system		
Mockler et al (1999)	Field Visit	Diffusion of IT	Political and economic, ownership, technology and competitive environment	The four factors found to have significant impact in the diffusion of IT.
Montealegre (1994)	Longitudinal case study	Role of managers in the implementation of IT in an agro industry organization in Guatemala	Economic and social system	Resourceful company managers have helped to shape their company and the economic and social systems around them to successfully implement an agricultural information system.
Montealegre (1998)	Longitudinal case study	IT implementation in an agro industry organization in Guatemala	Social and economic	Organizations may gain more from informating their environment than from merely automating its production process
Montealegre (1999a)	Multiple case study	Internet adoption in Chile, Costa Rica, Ecuador and Peru	Role of Institutions	Role of government, academia, telecom service provider and international community were instrumental in the adoption of the Internet in the four countries.
Raman and Yap (1996)	Case Study	Government policies and its impact on IT production and use in Malaysia	Government Role	Government policies addressing IT infrastructure, education and training, research and development had positive influence on the demand for IT products and services, number of IT professionals, Teledensity and IT production and use
Robey et al, 1990	Case study	Experience of multinational corporation in implementing IS in two Latin America countries	Cultural factors	Implementation of the same system was successful in one country but a failure in the other. Cultural differences were one of the factors for the differences in the implementation outcomes.
Utomo and Dodgson (2001)	Case Study	IT diffusion within small and medium sized firms in Indonesia	Government Support, Higher education institutes	Existence of academia-industry linkages indirectly influences business confidence in technological innovation Government policies that are designed to facilitate industry development and linkage strongly influences the diffusion of IT
Vreede et al (19998)	Field Experiment using grounded theory	GSS acceptance in three African Counties: Malawi, Zimbabwe and Tanzania	Culture	Develop a model of GSS acceptance in the "cultures investigated" that extends TAM. Political influence, oral communication preference and referent power have found to affect acceptance of GSS

3.2.3 Implications and Theoretical Perspectives

From the notion of the discussions advanced hitherto, it can be surmised that the literature on the developing countries' context and IT appears to promote the need for considering the socio-cultural, politico-economical and technological environment of developing countries both in the implementation and investigation of ICT related innovations (such as eCommerce). In fact, this is very crucial in ICT applications, such as eCommerce, that cut across firm boundaries (Montealegre, 1999a).

For example, Austin (1990) urges managers in developing countries to systematically analyze the business environment in which they plan to implement technologies. This analysis might involve examining (1) the exchange factors such as markets, the location of resources, customers and the power of competitors and (2) the rules, regulations, norms and general expectations that shape organizational life (Munene, 1995; Munene, 1991). The former is referred to as the exchange perspective, while the latter is the institutional perspective (Munene, 1995; Scott, 1991).

On the other hand, Porter (1990) refers to these forces of the national context within which organizations operate and compete as "determinants of competitiveness" and identify four dimensions: *demand conditions, related and supporting industries, factor conditions and government.* Yap (1990), however, labeled them as "general", which includes social, economic, political, legal and cultural and "specific", which includes customers, suppliers, and competitors.

Munene (1991) combines both exchange and institutional views of the external environment and argues that African managers have little control over their environment because of (1) their perceived inability to influence the external environment *(powerlessness)*, (2) feedback time lag (3) lack of information, (4) unreliable inter-organizational relationships and (5) lack of policy standardization. He concludes that the combination of the institutional and exchange characteristics of the organizational environment on the African continent appears to create a *"complex, uncertain and hostile"* environment putting barriers on the strategic choices and direction of businesses (Munene, 1991).

Munene's argument, like most of the literature in Table 3.2, appears to center on the *environmental determinism* view. *Environmental determinism* posits direct influences of the

external environment on all aspects of the decision-making within an organization (Winner, 1977; Lawrence and Lorsch, 1967; Dill, 1958). However, other models such as *organizational choice, organizational ecology, and system interactionism* differ from the *environmental determinism* view in terms of the role given to the environment vis-à-vis the actions of individual organizations (Montealegre, 1999b; Robey and Zmud, 1992; Carroll, 1988).

Organizational choice maintains the position that the course of an organization and the process of change are primarily shaped by organizational actors in general and innovative organizational leaders in particular and the environment's influence is insignificant (Robey and Zmud, 1992; Scarbrough and Corbett, 1992).

The *organizational ecology* model on the other hand conjectures that the interrelationships between the organization and the environment and the conditions they engender constitutes an ecosystem defining the "niche" the organization maintains within the environment (Robey and Zmud, 1992; Carroll, 1988). Hence, the environment is seen not only as one imposing constraints but also in terms of the niches it offers. This concept of niche arising from the national environment is eloquently described in Porter's theory of the competitiveness of nations (Porter, 1990).

In the *system interactionism* model, there is a co-influence between the forces of the external environment and the internal organization such that the external environment determines the internal organization, which in turn through deliberate (articulating a problem or formulating a solution) and at times unintentional actions shapes the conditions external to the organization (Jarvenpaa and Leidner, 1998; Montealegre, 1994; Orlikowski, 1993; Orlikowski and Robey, 1991). The interaction is cyclical in that the altered environment in turn produces new conditions for managerial actions either to reinforce or change the external environment making the model dynamic (Montealegre, 1999b; Orlikowski, 1993).

Montealegre (1999b) purports that the interactionism model, with its spark of mutual co-influence between the environment and the organization, can explain the marked differences in the performance of organizations in identical contextual situations.

Table 3.3 Summary of Theoretical Perspectives on the Role of the External Environment

Perspective	References	Central Theme
Environmental Determinism	Munene(1991), Winner (1977); Lawrence and Lorsch (1967), Dill (1958)	Conditions in the external environment of organizations shape all aspects of their internal environment.
Organizational Choice	Robey and Zmud (1992) Scarbrough Corbett (1992)	Organizations bypass the constraints of their environment and their decision is the only determinant of outcome.
Organizational Ecology	Robey and Zmud (1992) Carroll (1998), Miller (1984), Hanna and Freeman (1989)	The interrelationships between the organization and the environment and the conditions they engender constitute an ecosystem defining the "niche" the organization maintains within the environment.
System Interactionism	Jarvenpaa and Leidner (1998) Montealegre (1999b), Orlikowski (1993)	The forces of the external environment are powerful determinants of the internal environment, which in turn provides the context of most actions.

This thesis subscribes to the position of the literature in considering the external environment in the investigation of ICT implementations in developing countries. Likewise, the context of developing countries might influence businesses' eCommerce initiatives and its outcome. The study therefore promotes the argument that without due analysis of the external environment, studying eCommerce, its adoption and subsequent results in developing countries would be flawed from the start. Nonetheless, the study advocates the approaches of organizational ecology and system interactionism on the role of the external environment and its relationship with the organization in affecting eCommerce in developing countries.

Organizational ecology is promoted because the notion of "niche" advanced in this perspective is appropriate in describing eCommerce. Indeed, the dotcom boom was one characterized by finding and satisfying a "niche" in the market before anybody else. In addition, one of the popularized benefits of eCommerce for developing countries is its potential to provide them with "niche" markets (see for example UNCTAD, 2001b and Bekele, 2000).

The explanatory power of the interactionism perspective, on the other hand, might bring insight into organizational differences in eCommerce activities despite operating in a more or less identical environment. The integration of these two perspectives can provide a more comprehensive and dynamic model of eCommerce success in developing countries. In so doing, the study hopes to contribute towards addressing Lehman's (1996) call for IT

management models for developing countries. With this understanding, the next section turns to reviewing the literature on eCommerce in general and in developing countries in particular.

3.3 ECOMMERCE RESEARCH

The review in this section starts by looking into the existing literature on eCommerce and developing countries. It then moves to discussing the general eCommerce and related studies that are deemed to be relevant for the purposes of this study. These include previous studies on eCommerce migration paths, benefits, barriers and impacts.

3.3.1 eCommerce and Developing Countries

The state of research on eCommerce and developing countries can easily be surmised from the discussions advanced in chapter one. The literature in this area (See Table 3.4 for a summary) originates mostly from multilateral development agencies, which appear to consider eCommerce as a special development opportunity and an engine for economic growth (ITU, 1999; UNCTAD, 1999). Two interrelated themes- potentials and challenges- characterize this literature.

On the potential side, eCommerce is often recognized as having unveiled a window of opportunity towards solving many of the problems that confront developing countries. Some of the key general ideas that have dominated such debates include commerce's potential in reducing market barriers, expanding market reach; increasing efficiency, creating employment opportunities, improving trade and contributing to sustainable development (The World Bank, 2001; UNCTAD, 2001; ITU, 1999; UNECA, 1999; UNDP, 1998). However, the same sources argue that the hypothesized potential of eCommerce would largely be undermined by the extant realities of developing countries vis-à-vis the requirements of eCommerce. The literature in this regard outlines the multi-prong challenges developing countries have to overcome in order to convert the potentials of eCommerce into actual gains. Such challenges cover almost all aspects of the technological, legal, social, political, cultural, and economical environment (see Table 3.4).

Table 3.4 Summary of the Literature on eCommerce and Developing Countries

Author	Focus	eCommerce layer addressed (Fig 2.3)	Key Argument/Finding/Remark
Jenson (1999)	An assessment of eCommerce Potential and challenges in Africa	Hard and soft infrastructure and economy	eCommerce's potential for Africa would be undermined because of limited information infrastructure, low level of economic development, limited internet user to build critical mass, limited skill base to build eCommerce services.
Sheats (2001)	Role of eCommerce in achieving a sustainable economy	Economy	Fundamental changes in the way consumer demands are satisfied are essential for sustainable development in developing countries. E-services represent new technologies and business models and contribute to achieving sustainable economy.
Montealegre (1996)	Implications of eCommerce for managers in developing countries	Business functions, models and relationships	Managers in developing countries need to understand the potential and challenges of eCommerce; how the web can be used as information, marketing and communication resource and devise new strategies for doing business on the Internet.
Kamel & Hussein (1999)	Egypt's Internet evolution from academia to commercial takeoff	Hard infrastructure and economy	Government, in partnership with the private sector, played a key role in promoting value-added information and business services in electronic commerce. Highlights the lessons learned in facing infrastructure limitations
Davis (1999)	The status of eCommerce in Latin America	Economy, functions relationships , and Infrastructure	A relatively weak technological and educational infrastructure, highly skewed distribution of income, scarcity of capital for new ventures, a traditional business culture, retrofitting policy and legal frameworks affect eCommerce in Latin America.
UNECA (1999a)	ADF 99 eCommerce debate summary	economy business models, and hard and soft infrastructure	Identify the barriers of eCommerce spanning all the dimensions of the hierarchical framework provided in Fig. 2.3. Identify export oriented tele-service eBusiness as the most likely short-term course of action for Africa eCommerce.
The World Bank (2001)	eCommerce in developing countries	Economy	Effects of eCommerce on productivity, international trade, income distribution, policy and impediments to Internet use in developing countries
Mann (2001)	eCommerce and international trade	Business relationship and economy	Outlines that a commitment to eCommerce is a commitment to trade and development
Mann (2000)	eCommerce' implications for developing countries		Without a legal system, telecommunications regulations and financial transactions, there is no eCommerce
Goldesticin &Oconnor (2000)	Internet's contributions and its application to development		Developing countries have to overcome infrastructure constraints in telecommunications, transport, logistics and eCommerce governance issues related to consumer protection, transaction security, records privacy and intellectual property.
Licker (2001)	eCommerce and marginalization	Economy	Discuss various conceptualizations of "winning" and "losing" and explore one form of losing –marginalization in the context of eCommerce.
UNCTAD (1999)	eCommerce and Trade	Economy, hard infrastructure	ECommerce has the potential to be a major engine for trade and development on a global scale. There is a need for the production of data, analyses and scenarios relevant to eCommerce and development and its impact on developing countries.

The notion of eCommerce challenges advanced by the development agencies is also reflected in the world of academia. Mann (2000), for example, argues that eCommerce is unthinkable without legal system, telecommunications regulations and financial infrastructure and went further (Mann, 2001) to stress that a *commitment to eCommerce is a commitment to trade and development*. This same notion of the role of eCommerce in development is also pursued by Sheats (2001) who postulates that sustainable development in developing countries requires fundamental changes in the way consumer demands are satisfied. Sheats claims that new technologies and business models packaged in eCommerce might cause such changes. Obviously, many researchers on IT and developing countries, as mentioned earlier, would dispute Sheats (2001) position of technology induced changes in developing countries and would rather argue that changes in developing countries are often caused by political upheavals of grand proportion.

Weaknesses of the developing countries' context in relation to eCommerce and eCommerce's impact on developing countries are also subjects of many debates (Alaa and Stockman, 2001; Goldstein and O'connor, 2000; Kamel and Hussein, 1999; Kamel and Hussein, 2000; Davis, 1999; Srikantaiah and Dong, 1998). However, in both the practitioner and academic worlds, consensus appears to emerge that eCommerce is neither the magic bullet that its aficionados allude to nor a passing fad that its critics claim to (UNCTAD, 2001). It inevitably results in winners and losers of developing countries.

In a series of conceptual papers, Licker and Motts (2000) and Licker (2001) discuss different scenarios of 'winning' and 'losing' and explore one form of losing they call "marginalization" and its different manifestations. Licker (2001) critiques that current eCommerce initiatives are characterized by "supply side" strategies where suppliers push their offerings, without due consideration to the context, hoping that the network effect will take care of the demand side. If "marginalization" is to be averted, Licker argues, that a "demand driven" approach needs to be followed (Licker, 2001).

Prescriptions on improving the policy, legal, infrastructural and governance environments of eCommerce in developing countries are not in short supply. Of all these lists, the most significant one appears to be improving national information infrastructure and connectivity (UNCTAD, 2001; Mann 2000; UNECA, 1999b). In relation to the how part of improving national connectivity, the conventional wisdom urges developing countries to fully liberalize

their telecommunications market, adopt and fully implement the pro-competitive reform principles embodied in the WTO General Agreement on Trade and Services (GATS) (see for example WEC, 2000). In fact some have already subscribed to that (see for example Jensen, 1999). Nevertheless, based on a survey of telecom stakeholders in developing countries, Mbarika et al (2002) warn against such "band-aid prescriptions" and recommend that developing countries in general and African countries in particular need to espouse a self-sufficiency strategy based on regional cooperation and alliance.

Most of the existing non-empirical literature on eCommerce and developing countries focus on macro level issues and requirements and a few are addressing it at an organizational level. Inevitably, it will take several decades before developing countries can fully and satisfactorily address the multi-prong challenges of eCommerce the literature documented. Following arguments from organizational ecology models, this can be argued to affect the extent to which the developing countries' environment is going to be conducive and enabling for creating eCommerce "niches". However, from a system interactionism perspective, it would be imperative that established businesses in developing countries engage the environmental adversaries (see for example Kebede, 2001; Bekele, 2000) and take proactive action to seize the opportunities of eCommerce and share from of its benefits.

In what appears to be an early call, Montealegre (1996), while recognizing the contextual constraints, stresses that organizations in developing countries need to work towards improving their internal organization preparation in order to be able to operate and compete in the new environment constantly being shaped by eCommerce. He further posits that for developing countries to be able to avoid being relegated to the periphery of eCommerce and its benefits, skilful and forward looking managers need to (1) understand the technical and business capabilities of the global network (2) view it in accordance with their context and idiosyncrasies and (3) free themselves from a passive role as receivers of models to become active participants and change agents (Montealegre, 1996).

Empirical studies of eCommerce in developing countries are scarce. But the experiences of Ethiogift.com (Bekele, 2000) and Genuineleathercrafts.com (Kebede, 2001), eCommerce ventures from Ethiopia, appear to support the notion of the system interactionsim thesis advanced by Montealegre (1999, 1996, 1994), Jarvenpaa and Leidner (1998) and Barrett and Walsham (1995). These two eVentures, despite operating in what can be considered, by any

conventional standard, as an eCommerce inimical environment, contributed significantly in giving a wakeup call to Ethiopian policy makers and business community. The immediate effects were two national level workshops on eCommerce, ICT and development; establishment of an eCommerce unit within the government's Export Promotion Agency and a senior management discussion in the National Bank of Ethiopia on issues of handling eCommerce transactions.

Table 3.5 summarizes examples of organizational level empirical studies of eCommerce in developing countries. The studies, in addition to their insignificant number, are limited in scope and methodology. Mostly they address hard infrastructure constraints and are based on a single case study. In general, the following limitations can be noted in the existing literature on eCommerce in developing countries.

- Much of the current knowledge of eCommerce in developing countries is based on speculative arguments about the potential of eCommerce.
- The studies appear to work from an "environmental determinism" and "external influence models" perspective and mostly focus on identifying the weaknesses of the national context. However, substantive issues regarding organizations in developing countries and their wherewithal, propensity and role to co-influence the national context are generally ignored.
- The studies consist more of prescriptions and anecdotal descriptions without much thought to theory and analytical methods for studying the interplay between the context and organizations.
- The descriptive studies are often limited to a single case and there is a poor link to theoretical frameworks.
- There is little conceptual and empirical research on eCommerce in developing countries at an organizational level.

Table 3.5 Empirical Studies in eCommerce in Developing Countries

Reference	Method	Focus of study	Level of Analysis (Ref. Fig.2.3)	Key Findings
Bekele (2000) Kebede (2001)	Case study	ECommerce benefits and challenges	Business Models and relationships	Based on experience of operating eVentures in Ethiopia, outline challenges small businesses in developing countries face in conducting global commerce. Benefits include bypassing intermediaries, facilitating trade promotion and improving marketing efforts.
Enns and Huff (1999)	Case study	Factors affecting the implementation of ISP projects in Mongolia	Hard infrastructure	A number of factors related to the political environment, economic conditions, culture, technology, intra-organizational, and inter-organizational components have found to have an impact on the successful implementation of ISP projects.
Mukti, 2000	Survey	Potential barriers to eCommerce	Business relationship	Security and uncertainty of legal contract between supplier and customer and lack of skilled IT.
Mbarika et al (2002)	Survey	Stakeholders' assessment on telecom strategies	Hard infrastructure	Africa's LDCs should adopt a self-sufficiency approach and also create regional alliances for sustainable development of telecommunications infrastructure
Travica (2002)	Case Study (field study)	Diffusion of electronic commerce in Costa Rica	Hard and soft infrastructure, business functions	Based on a quasi-hierarchical model of eCommerce diffusion-transportation, delivery, telecom infrastructure, software industry, e-payment, customer eCommerce propensity, and eCommerce- identify favorable conditions and obstacles of eCommerce diffusion in Costa Rica.

The next section provides a review of the relevant general eCommerce literature. Emphasis will be on eCommerce migration paths and theoretical frameworks that promote an understandings of eCommerce benefits barriers and migration paths.

3.3.2. Literature Review on the Benefits and Barriers of eCommerce

3.3.2.1 eCommerce benefits

The literature is full of promises about the benefits of eCommerce. The most widely referred to theories (either explicitly or otherwise) in the discussion of eCommerce benefits are the theories of richness (Evans and Wurster, 2000; Senn, 2000), competitive advantage (Digman

and Fruhling, 2000; Schuete, 2000; Warrington et al 2000) and transactional cost theory (Chappell and Feindt, 1999; Coppel, 2000; Wigand et al, 1997; Wigand, 1995).

Evans and Wurster (2000) consider eCommerce as having the potential to blow the tradeoff between "richness" and "reach". Richness refers to *"the quality of information, as defined by the user: accuracy, bandwidth, currency, customization, interactivity, relevance*". Reach on the other hand measures the number of people who participate in the sharing of that information. Traditionally, there is a tradeoff between richness and reach in that rich content (in the sense of Evans and Wurster, 2000) can only be served for a very small number of people. However, eCommerce creates the potential for "mass customization" without compromising "mass production" (Hartman et al, 2000) and allows businesses to reach a large number of people with rich information.

The concept of reach forms the basis for the most widely quoted benefit of eCommerce in general and for developing countries in particular. eCommerce, due to the global nature of its platform-independent network, is widely touted with the benefit of extending firms' reach irrespective of their size and location to markets that would have otherwise been impossible to them (Korper and Ellis, 2000; Senn, 2000). Access to markets could help firms overcome the traditional limitations of marketing and sales including process, size and location of sales force, the breadth and depth of distribution networks, etc. In terms of empirical support, a survey conducted by Chappell and Feindt (1999) indicates that gaining access to new markets and improved customer relationships are the most widely mentioned benefits of eCommerce.

eCommerce is also associated with enabling organizations to significantly reduce marketing, operation and transaction costs (Oxley and Bernard, 2001; Wigand et al, 1997; Benjamin and Wigand, 1995;Wigand, 1995). Such theses generally draw from transaction cost theory. Transaction costs (*market or hierarchy)* refer to the cost of coordination in the production and marketing of a product (Wigand and Benjamin, 1995). Market transactions refer to those that support coordination between multiple buyers and sellers. Hierarchy transactions on the other hand refer to those supporting coordination within the firm as well as the industry value chain (Benjamin and Wigand, 1997; Wigand and Benjamin, 1995). eCommerce cost savings are expected from reductions in operation costs such as personnel, rent, order and payment processing (Chappeal and Feindt, 1999); in customer management costs such as cost of

communications, interactions and handling customers' information (Hartman et al, 2000) and in bypassing and/or augmenting traditional channels (Senn, 2000).

Reduced coordination (transaction) costs can enable organizations to render the same level of service and provide the same quality of product but charge consumers reduced prices, thus making all parties in the market beneficiaries (Hartman et al, 2000; APEC, 1999, Coppel, 2000). Hartman et al (2000) extend this and provide examples that indicate how the different (and new) ways of generating value that is embedded in eCommerce enable organizations to sell at a price even below their cost and still maintain their profitability. However, empirical support to back such claims and exceptional incidences is very scarce. In fact Chappell and Feindt (1999) indicate that cost savings are not the key drivers of embarking on eCommerce. NNI (1999) also supports this and suggests that expecting cost savings from eCommerce instantly is not realistic and such benefits might take a long time before they actually show up.

eCommerce cost reduction benefit is also echoed in the studies that relate eCommerce with competitive advantage (Digman and Fruhling, 2000; Schuette, 2000; Warrington et al , 2000). Porter (1984) proposes two sources (forms, strategies) of competitive advantage: (1) cost leadership and (2) product differentiation.

Fruhling and Digamn (2000) claim that organizations that use eCommerce can implement mass customization strategies and produce products and services that suit the needs and preferences of individual consumers. The authors also posit that eCommerce allows organizations to have direct contact with their consumers and other business partners by reengineering the selling and distribution process and eliminating a number of activities. This results in reduced costs of distribution, marketing and overheads, which in turn can increase the bottom-line for businesses and allow investing in other growth opportunities. As a result, eCommerce might lead to adopting cost leadership strategies and promoting competitiveness.

Although the existing literature enthusiastically endorses eCommerce as having such potential benefits, there is a general lack of empirical research to support the claims. To the contrary, emerging studies hint to a significant gap between the anticipated and actual achievements from eCommerce (Marshall et al, 2000; NNI, 1999). Nonetheless, such disappointing shortfalls of eCommerce benefits from expectations are attributed to a lack of proper understanding of the models by which the anticipated benefits are to be realized, lack of requisite skills, lack of

eCommerce governance, lack of integration or in general implementation and management issues (Marshall, et al, 2000; Hartman et al, 2000; Hackbarth and Kettinger, 2000; Truman, 2000; NNI, 1999).

The notion of the discussion on eCommerce benefits advanced thus far will have several implications in the development of theory based eCommerce success criteria and metrics. First, success criteria should be sensitive to the maturity level of eCommerce. In addition, success criteria have to reflect the primary reason why organizations are adopting eCommerce and should have the capacity to discern problems that arise as a result of implementation and management problems.

3.3.2.2 eCommerce Barriers

Globally, eCommerce is diffusing at various rates and in so many different directions (Palvia et al, 2002). It is redrawing the global trade and commerce in such a way that even the most advanced countries and businesses are often at a loss to manage and overcome its implications and challenges. This section examines the general eCommerce and related literature that discuss barriers to eCommerce. In order to motivate the main thrust of this study, emphasis will be placed more on theoretical (or classificatory) frameworks than on anecdotal descriptions of eCommerce barriers.

Consistent with our focus on established businesses and their migration to the eCommerce way of conducting business, we found it relevant to use the IS literature as a platform from which to direct this particular investigation. Indeed this choice is not arbitrary but rather draws from conceptual works that claim eCommerce to have similarities with information systems (Molla and Licker, 2001; Alaa and Stockman, 2001).

IS literature on the investigation of barriers to information systems dates back more than two decades. Several frameworks have emerged as a result of using various perspectives. Examples of these are abundant. Table 3.6 summarizes the most notable frameworks based on discussions in Al-Abdul-Gader (1999).

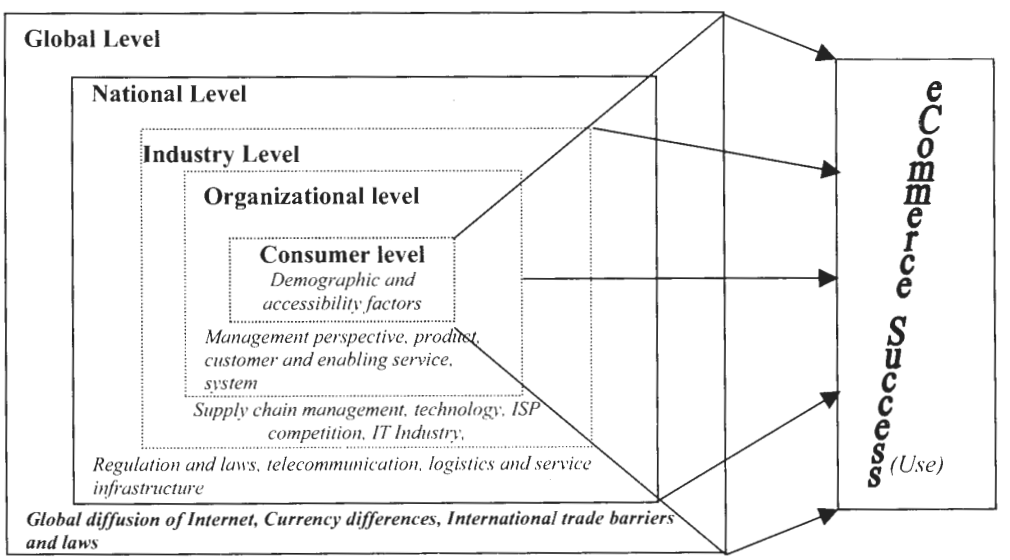
Table 3.6 Frameworks of IS Implementation Barriers

Reference	Criteria	Categories	Variables
Ein-Dor and Segev (1978)	Level of control	Uncontrollable	Technology, organization time frame
		Partially controllable	Psychological climate and system development back log
		Fully controllable	IS resource, training, authority, executives, and policies
Ives et al (1980)	Location of the problem	External environment	Social, political, cultural and economic issues
		Organizational environment	Resources, culture, goals, tasks, structure, and management philosophy
		User environment	Users' characteristics, users peers, and users tasks
		System development environment	Development methodology, tools, team skills and knowledge, organization and management of development function
		Development process	Selection of resources for development
		Operation process	Use of IT resources to operate IT systems
		Use process	User utilization of IT systems to accomplish user tasks
		IS applications	The content presentation form, and timing of systems
Woherem (1992)	Impact of the problem	Operational	Lack of skilled staff, lack of capacity, under-utilization of technology
		Contextual	Values, Norms,
		Strategic	Selection of appropriate application, national policies, lack of maintenance culture, ignorance of socio-economic barriers, lack of vendor role as trainer

The frameworks in table 3.6 provide a starter kit to any discussion of eCommerce barriers both in the developing and developed world. Moreover, the three criteria in table 3.6 are not mutually exclusive and can together be used to form a comprehensive understanding of eCommerce barriers. Nonetheless, of the three frameworks summarized in Table 3.6, Ives et al's (1980) classificatory framework has wider acceptance and pertinence (Al-Abdul-Gader, 1999). However, because information systems, at least as it was understood in the past,

focused mainly on information provision and because eCommerce systems in addition to information provision serve transactional and customer service purposes, Ives et al's (1980) work needs to be revised to reflect the eCommerce context. Muthitacharoen (2000), based on a review of 103 academic and trade articles, proposes a comprehensive classificatory framework that can complement Ives et al's work. In addition, she also hypothesized the potential impact of these barriers on eCommerce success. Figure 3.2 represents a visual impression of his proposed framework. In addition, Muthitacharoen hypothesized the impact of the barriers on eCommerce success. These two frameworks together with our quasi-hierarchical framework in Figure 2.3 can be used to guide the review of the literature on eCommerce barriers.

Figure 3.3 Comprehensive Framework for Key Factors of eCommerce



(Source: Muthitacharoen, 2000: 30-33)

A plethora of eCommerce barriers that fall either in one of the levels discussed above (Sprano and Zakak, 2000; Schuette, 2000; Warrington et al, 2000; Chappell and Feindt, 1999; Chappell et al, 1999; Korper and Ellis, 2000; Larsen and McGuire, 1998) or that cut across levels (Palvia et al, 2002; Bingi et al, 2000; Muthitacharoen, 2000; Penbera, 1999; Zwass, 1998) are documented in the literature.

Organizational barriers indicate the lack of preparation of organizations and their point of vulnerability when it comes to operating in eCommerce. Success in eCommerce therefore, amongst other things, requires addressing such organizational obstacles. Some of the barriers

however fall outside the bounds and limits of organizations or even a nation state. While this is a global phenomenon, the conventional wisdom on eCommerce in developing countries, perhaps arguably, considers national level barriers as imperatives and does not address organizational issues. However, the notions of interactionism and mixed influence pursued in this thesis call for an examination into both organizational and environmental issues. Further, the notion of organizational ecology posits that the environment contains not only constraints but also niches.

eCommerce barriers, its evolving nature, its uncertainties and risks demand organizations to carefully nurture and support and purposefully govern eCommerce. Because capabilities, risk taking behavior and innovativeness vary from one organization to another, it is inevitable that different organizations be found at different stages of eCommerce implementation. One way of understanding such variations in the status of eCommerce implementation among organizations is through eCommerce maturity models. The following section presents a review of the literature on eCommerce maturity models.

3.3.3 Literature Review on eCommerce Maturity Models[1]

The eCommerce conceptualization introduced in chapter 2 and the framework in figure 2.3 upon which the conceptualization is anchored implies that eCommerce represents a cluster of hard and soft technologies that are blended in the form of business models in order to support and render business functions internally among various units and externally with members of the extended enterprise including government. We call this process an eCommercizing process. Across the globe, we can witness organizations at various levels of "eCommercizing" their internal operations and their external relations. The literature suggests a number of models describing possible migration paths in this eCommercizing process.

Even if the original idea of migration paths can be attributed to Darwin, many development (see Roux and Graaff, 2001) and IS researchers (see Galliers and Sutherland, 1994) have contributed to maturity models in their respective disciplines. In the development arena, such theories come in the form of evolutionism theory with Rostow and what is now known as "Rostowian" ideas of development (see for a review Roux and Graaff, 2001). In the IS field,

[1] Throughout this document the terms eCommerce stages of growth, eCommerce maturity, eCommerce status and eCommerce migration path are used interchangeably.

Nolan (1973) pioneers the stages of growth (SOG) model. In both disciplines, the theories posit that development in general (for "Rostowians") and in the management and use of computers (IS/IT) in particular (for "Nolanians") can be conceived of in terms of various and clearly defined stages of maturity (Roux and Graaff, 2001; Nolan, 1979; Nolan, 1973). Evolutionism proposes that social changes and transformations happen in stages and such stages are *linear, gradual, irreversible and progressive*. In a similar vein, Nolan's stages of growth (SOG) premises that organizations linearly pass through a number of identifiable growth phases in planning, managing and using computers (IS).

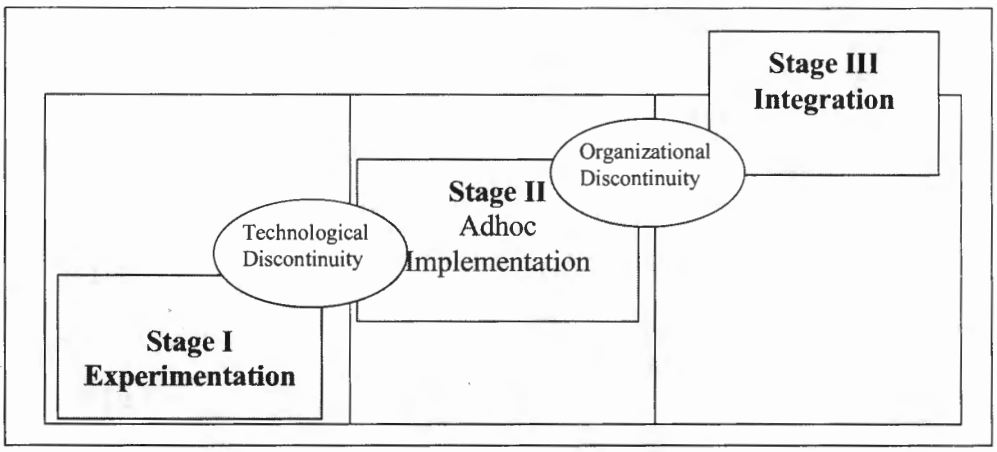
Many variants of the Nolan's SOG model have appeared in the IS field describing either specific IS issues such as IS planning or general IS management issues (Damsgaard and Scheepers, 2000; Galliers et al, 1998; Galliers and Sutherland, 1994). While most of the SOG models predate eCommerce, Galliers and Sutherland (1994) revise and propose an extended SOG model that also covers inter-organizational systems. The model represents IT maturity of organizations in terms of six stages, each associated with a particular set of human, technological, system and management features. It is interesting to note that in their model, Galliers and Sutherland (1994) consider implementing inter-organizational systems (with suppliers, customers, government, etc) as one of the distinguishing features of an organization with a matured IT. This representation tends to be invalid in view of eCommerce where even the most rudimentary applications such as e-mail and static Web sites demonstrate an inter-organizational feature.

Criticisms of evolutionism thinking are abundant in both IS (see Galliers et al 1998; Galliers and Sutherland, 1994) and development (see Roux and Graaff, 2001) fields. Some of these include the assumption of a uni-lineal path from lower to higher stages, neglect of the multifarious cultural and social contexts; the static nature of the models; focus on description of the status rather than the process of achieving maturity; indifference to possible variations in maturity within a given society and organization, etc. Despite such strong criticisms, the eCommerce literature has given a new face to SOG models.

eCommerce researchers appear to accept that organizations follow certain migration paths in the eCommercizing process. For example, the NNI (Nolan Norton Institute) (1999) suggests a three-stage eCommerce maturity (sophistication) model (see Figure 3.4). The stages are *experimentation, adhoc implementation and integration.* The model helps to identify (at least

at conceptual level) the different "*stages an organization moves through in terms of adoption and implementation of electronic commerce*". The model also indicates the various possibilities within each stage and the different hurdles (discontinuities) that organizations have to overcome in making inter-stage transitions.

Figure 3.4 Nolan Norton Institute eCommerce Maturity Model



(Source : NNI, 1999)

Other researchers (Hackbarth and Kettinger, 2000; Hartman et al, 2000; McKay et al, 2000; April and Cradock, 2000; Deise et al, 2000; PricewaterhouseCoopers, 2000; Damsgaard and Scheepers, 2000; King and Cliff, 1999; Piturro, 1999, APEC, 1999) also promote this same idea of organizations migrating to eCommerce by following different paths. Nonetheless, the number of stages in the models, the criteria used to derive the models and the descriptions of the stages vary from one source to another and from the one provided by the NNI (see Table 3.7 for a summary).

Despite differences in the number of stages in each model, similarities in the characteristics of the individual stages suggested by Hartman et al (2000), Hackbarth and Kettinger (2000) and NNI (1999) can be observed. For example, parallels can be drawn between the new fundamentals and rational experimentation stages of Hartman et al and the experimentation stages of the NNI model. By the same token the operational excellence category of Hartman et al can be related to the integration stage of NNI. However, while NNI's and Hackbarth and Kettinger's model have no explicit criteria to derive each stage and rather depend on characteristics descriptions that span a number of technology, management and organizational issues, Hartman et al's model is based on two dimensions of business criticality (from low to high) and degree of innovation (low to high).

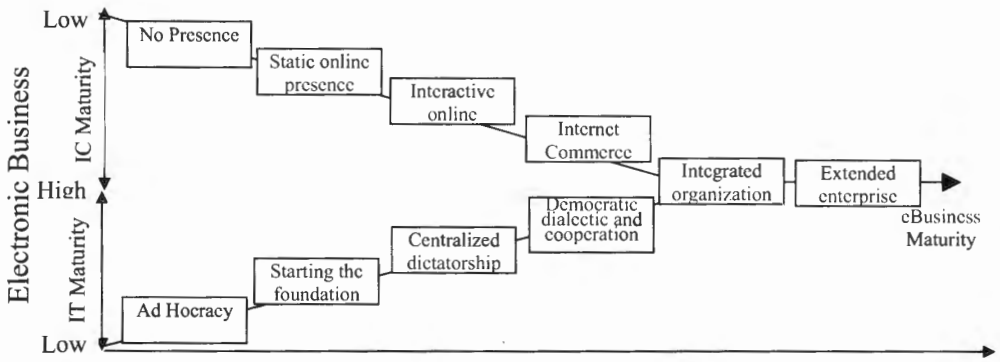
Table 3.7 Summary of eCommerce Maturity Models

Reference	Description
APEC, 1999	1. Basic online capability 2. Web site but no advanced capability 3. Provide customer service 4. Complete transaction including payment
April and Cradock (2000) Deise et al (2000)	1. Channel Enhancement 2. Value Chain Transformation 3. Industry Transformation 4. Convergence
Hackbarth and Kettinger, 2000	1. Experimentation 2. Integration 3. Transformation
Hartman et, al, 2000	1. New fundamentals 2. Experimentation 3. Breakthrough 4. Operational excellence
King and Cliff, 1999	1. Static Web sites 2. Integrated Sites 3. Forming vertical and horizontal communities 4. Creating new business values and computations
McKay et al (2000)	IT Maturity / IC Maturity 1. Ad Hocracy — 1. No presence 2. Starting the foundation — 2. Static online presence 3. Centralized dictatorship — 3. Interactive online presence 4. Democratic, dialectic and cooperation — 4. Internet commerce 5. Integrated organization 6. Extended enterprise
NNI (1999)	1. Experimentation 2. Adhoc implementation 3. Integration
PricewaterhouseCoopers (2000)	1. Online presence 2. Online business 3. Integrated online business 4. Advanced online business 5. Full e-business

The models described in McKay et al (2000), PricewaterhouseCoopers (2000), APEC (1999) King and Cliff (1999), Piturro (1999) also show similarities in that they are all based on the degree of eCommercizing of the organization. However, McKay et al's (2000) model differs from the rest in two ways. First, while all the models start from the premise of basic eCommerce capability (such as online presence), Mackay et al's model includes "No presence" as the first stage. Second, the authors argue for differences among "internet commerce" "electronic Commerce" and "electronic business". Based on this premise, they articulate a six-stage Internet commerce maturity model-*no presence, static online presence, interactive online presence, Internet commerce, internal integration, and external integration*- distinct from e-

business maturity. Mckay et al further critique that previous models separate eCommerce from already employed IT and IS systems. In their claim to integrate the two, they propose an integrated eBusiness maturity model ("SOG-e"). The SOG-e maps their six stages of the Internet commerce maturity model with Galliers and Sutherland's (1994) integrated model of IT maturity (see Figure 3.5).

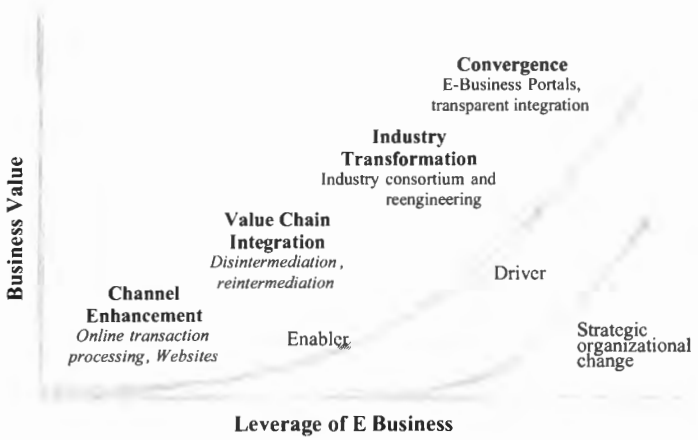
Figure 3.5 The SOG-e Model



(Source: Mckay et al, 2000)

Another observation related to the maturity models summarized in Table 3.7 is that while most of the models consider achieving integration as the last stage of maturity, Deise et al's (2000) model pushes the limit a little further and envisions other higher levels of maturity (see Figure 3.6). Deise et al describe these maturity stages in terms of the extent of changes the eCommercizing process causes on *customers and markets, products and services, people and organization, business processes and information systems/technology.*

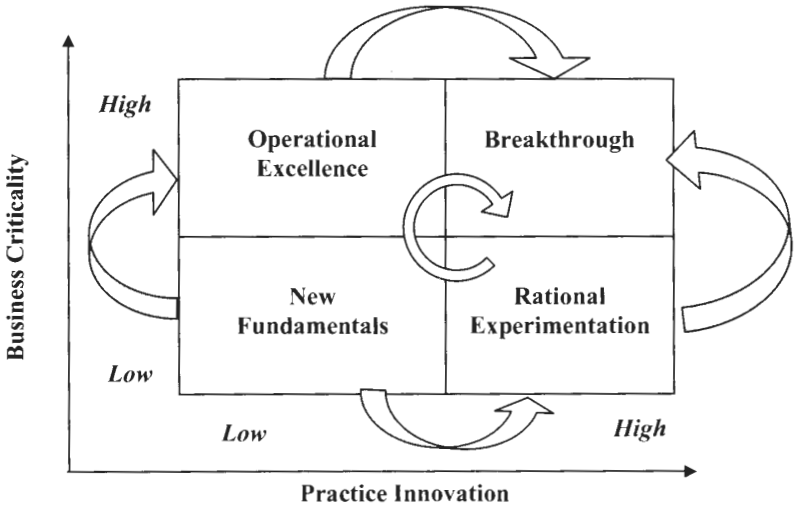
Figure 3. 6 E-Business Maturity Industry Transformation Model



(Source: Deise et al, 2000:1)

Despite the similarities discussed amongst some of the models, there is a major conceptual difference between Hartman et al's (2000) model and the rest on how organizations progress in attaining eCommerce maturity. Except Hartman et al's model, the rest of the models assume a stage-based uni-lineal progression from the lowest level of maturity to the highest stage of attaining integration by overcoming the hurdles of technological and organizational discontinuities. However, progression from one stage to another does not necessarily follow a linear path in the model suggested by Hartman et al (2000). Depending on strategic focus and emphasis on efficiency or value creation, organizations can follow different paths in their progression to matured eCommerce. Figure 3.7 adapted from Hartman et al (2000) schematically indicates these paths.

Figure 3.7 eCommerce Maturity Cycle



(Source: Based on Hartman et al, 2000)

Of course each of the above models has its own limitations and can be criticized in terms of its merits and demerits. We do not, however, intend to take up this task and scrutinize each model for conceptual flaws, as our focus is on the notion of conceptualizing eCommerce through such models and not trying to identify the winning model. However, emerging empirical studies (Young and Benamati, 2000; Poon and Swatman, 1999) claim a lack of eCommerce maturity as one of the reasons for poor results from eCommerce.

As depicted in Figure 2.1 of chapter 2 of this thesis, the development of eCommerce follows an evolutionary path. The maturity models, despite strong criticisms offer several advantages

for researchers and practitioners. From a research point of view, the models allow to succinctly, perhaps at the peril of simplicity, capture the eCommerce status of organizations. Nonetheless, the assumption of a linear progression from lower stages of maturity to higher stages is an untenable assumption in view of the concept and practices of leapfrogging (Davison et al, 2000). Leapfrogging posits that organizations can jump certain stages in order to achieve eCommerce maturity. However, eCommerce maturity itself is a moving target and not something that can be statically defined. As organizations explore and learn new ways of leveraging their business using this "cool innovation- eCommerce", what we now consider a mature stage would definitely be a lower stage of the future eCommerce panorama. This is a likely scenario considering how, in just over a decade, IT's role evolved from "automating" and "informating" the organization (Zuboff, 1988) to "transforming " and "converging" the industry (Deise et al, 2000).

For the research questions pursued in this study, considering eCommerce through a maturity model has several implications. The models imply that organizations have to maintain their e-readiness in order to successfully migrate from one stage to another, although such migrations may not necessarily follow a linear path. Moreover, it also implies the possibilities of observing different profiles of e-readiness associated with the level of eCommerce maturity. Thus, one research interest would be to investigate the nature of the relationship between e-readiness and eCommerce maturity. The next section provides a review of the literature on e-readiness.

3.4 E-READINESS [2]

From the notion of the discussions on eCommerce maturity models advanced in the previous section, it is apparent that eCommerce has proved to be more than having "cool and glitch free websites" (PricewaterhouseCoopers, 2000). However, the optimism, hype and a handful of well-publicized (and often controversial) success stories that surround eCommerce-related discussions seem to have been the driving forces of most eCommerce related decisions at various levels, at least that was the case at the beginning of 2000 (Hartman et al, 2000; Wilson, 1999; Goldberg and Sifonis, 1998).

[2] *While efforts have been made to update the review in this section, the section and the arguments read best if the reader considers the eCommerce scenario of 2000 and not 2002.*

The literature on e-readiness has exploded phenomenally in the two years between the commencement of this study (beginning of 2000) and the actual writing of the thesis (early 2002). The web search results reported in chapter one of this thesis offer rudimentary testimony to this. To do justice to the literature that come to the fore since mid 2000, some of our earlier arguments, such as the absence of literature on e-readiness, have to be toned down. However, our central argument of the lack of a theory based understanding of e-readiness and its impact on eCommerce success in general and in developing countries in particular stands the test of time. Therefore in order to have a broader understanding of the concept, it is essential to pursue the concept of readiness in the organizational and IS literature before clamping down on the e-readiness literature.

3.4.1 The Concept of Readiness in Organizational and IS Literature

Organizational change, information systems, business process reengineering and innovation literatures, among others, discuss the concept of readiness. Table 3.8 summarizes how the concept of readiness has been treated in various disciplines. In most of the cases, readiness is considered as the *necessary precondition* (or set of pre-conditions) for the implementation of a change program or an information system or a BPR project (Grover et al, 1995, Stoddard and Jarvenpaa, 1995). Burgelmen and Maidique, (1988) and Walton (1987), however treat readiness both as a necessary and sufficient condition to undertake an innovation program. There are also cases (Raymond et al 1998; Guha et al, 1997) where readiness is related to the success of the change, BPR and innovation programs, although the nature of the relationship is not explicitly defined.

Accordingly, having resources such as skilled manpower (Stoddard and Jarvenpaa, 1995), appropriate organizational culture (Todd, 1999; Guha et al, 1997,) organizational capabilities and learning (Tvorik and McGivern, 1997), and overall organizational commitment in the form of management and administrative support, staff involvement and championship (Synder-Halpern, 1998; Schneider and Brief, 1996) have been identified as constructs of readiness. Assessment of these various resources and factors in terms of what is required and what is acquired (or easily to be acquired) in relation to the desired innovations and its successful outcome has been considered as an important part of the whole decision making process and its outcome. Such assessment was also believed to evaluate the adopting organization's potential and ability to undertake a given program.

Table 3.8 Summary of Selected Research that Addresses the Concept of Readiness

Reference	Area	Remarks
Burgelmen and Maidique (1988); Walto (1987)	Innovation	Argues that readiness is both a necessary and sufficient condition to undertake an innovation program
Clark and Cavanaugh (1997)	Organizational Change/information systems	Readiness is considered as a state that describes the capability of an organization to respond to change. The organization readiness is reflected through a change ready vision, strategy, structure, process, people skills, and reward systems.
Grover et al (1995)	Business Process Reengineering	Readiness is a necessary precondition to undertake a BPR project. Constructs include leadership, technology, and human resources.
Guha et al (1997)	Business Process Reengineering	Culture, organization's learning, capacity, strategic leadership and technology are considered important dimensions that the organizations readiness to undertake a successful (and "significant") BPR project. Hence readiness is considered as a necessary condition for success in BPR
Jay and Smith (1996)	Organizational Change	Creating change readiness is key to successful change implementation. Readiness is considered as a multidimensional stage model and a necessary condition to undertake change. Constructs are change motivation, strategy, environmental analysis, over all buy in.
Kumar (1999)	Information Systems	Readiness is treated as an ability to quickly react to changes and as one of several types of flexibility. It is more or less considered as an end state. The constructs that lead to readiness are the speed at which the organization can deploy its resources in response to changes and information technology.
Synder-Halpern (1995)	Information Systems	Considers readiness as a determinant for the implementation of information systems and highlights overall organizational commitment in the form of management.

Jay and Smith (1996) split readiness into two phases; that of *orientation* and *preparation*. They suggest that these should come before the third phase, which is the implementation of the change program. The orientation phase includes *change motivation, developing a change strategy and organizing the project* while the preparation phase includes *environmental analysis, announcing the change direction, developing the change work plan, creating pain and providing direction*. The authors treat readiness as a multidimensional stage model but still in the "necessary" condition paradigm. In contrast to the above, Clark & Cavanaugh (1997) consider readiness as an end state into which organizations have to move. In their writing, they have argued that in order to be change-ready, an organization has to set a change-ready vision

and design and mold its *strategy, structure, process, people skills and reward systems* towards that end.

Three main lines of arguments can be identified from the above discussion. Some treat readiness as a necessary and/or sufficient precondition (or phases of preconditions). Others consider it as an end state towards which organizations strive. And still others discuss readiness as an antecedent to success. In all these paradigms, what the existing literature does not provide is a consolidated and systematic framework that explicitly defines the concept of e-readiness and addresses its different aspects in sufficient detail.

3.4.2 The E-Readiness Research

Over the last two years, a number of studies have emerged discussing e-readiness more directly, although the term used varies from one source to another. Depending on the unit of analysis the source refers to- national vs. organizational- the existing literature on e-readiness can likewise be classified into two main categories.

3.4.2.1 National focus

In one of the earlier works, the OECD expert group working party on indicators for the information society developed a three-stage model for assessing the maturity of electronic commerce. The group considers "eCommerce readiness" as the first stage in the path for the diffusion of eCommerce (OECD, 1999). McConnell and WITSA (2000), on the other hand, treat e-readiness as the source of national economic growth in the networked century and the prerequisite for successful e-business. Others such as APEC (2000) and CID/HU (2000) highlight e-readiness assessment as a mechanism for determining a nation's capacity for eCommerce and as a tool for guiding strategic planning processes for developing eCommerce. These are just a few of the assessment tools that have burgeoned in the last few years. A number of organizations including international heavyweights like the World Bank and the UN are conducting (and/or supporting) e-readiness assessments everywhere but particularly in developing countries.

Bridges.org, a South African based NGO, maintains a comprehensive list of e-readiness assessment tools and a summary of existing and ongoing projects [Bridges, 2002a and 2002b). The World Bank's infoDev site also hosts a repository of links to e-readiness assessments and methods (infoDev, 2002). Their findings indicate an alarming duplication of efforts and a

proliferation of e-readiness assessment tools (see Appendix 3A and 3B for a summary). For example, while Egypt and South Africa has been assessed nine and seven times respectively, no such assessment has been conducted in more than half of the countries in the rest of the continent (See Appendix 3B). At the time of writing this thesis, there were a total of 137 e-readiness assessment and at least five initiatives are underway to conduct further e-readiness assessments (Bridges, 2000b).

The proliferation of tools, of which no two are alike, is also a source of concern (Appendix 3A, Bridges, 2000a). While at the surface each e-readiness assessment tool measures the preparation of a nation as a conducive and nurturing environment for the information economy in general and eCommerce in particular, there is a clear lack of consensus among the developers of these tools. Practically, each tool differs from the other in terms of its conceptualization of e-readiness, its goal, the e-readiness being measured, results, standards and beneficiaries (See Bridges, 2000a for a comparison of existing tools).

In addition, by almost all of the existing e-readiness criteria and assessments, many of the developing countries are ranked as eCommerce laggards and "not e-ready". While this might be the case, it might take a long while before developing countries could meaningfully address the various challenges and move up the league of e-readiness. However, even within the prevailing policy, technology, human resource, and infrastructure conditions, some organizations in developing countries are implementing eCommerce and incorporating it into their operation (UNCTAD, 2001). But the existing e-readiness literature does not help to identify what drives those organizations to take such decisions in the environment that is categorically ranked as "not e- ready".

In addition, some of the existing e-readiness assessments seem to target international investors as their primary audience and appear to recommend that investors should heed their findings before investing in the countries that are rated as "not e-ready", which includes practically many of the developing countries. If all investors, probably except those that are interested in infrastructure development, are to heed such advice, then this raises a very serious concern and tends to refute the role of businesses in improving local conditions. It also shows the environmental determinism view that underlies many of the e-readiness studies. Moreover, it reinforces Persaud's (in *TheEconomist, 2000*) concern of reduced inward-investment to poorer countries because of eCommerce than the case might otherwise have been.

So far, we are aware of only one study (Oxley and Yeung, 2001) that has attempted to empirically test the impact of e-readiness on eCommerce activity. Working from an institutional economics perspective, and using secondary data, Oxley and Yeung investigate the institutional environment such as *rule of law, availability of credible payment channels, and physical infrastructure* (Internet) on eCommerce activity (using the number of Internet hosts as a proxy) of a cross section of 62 countries from both the developed and developing world. Despite methodological limitations well acknowledged by the authors, their findings indicate that the institutional environment is an insufficient condition for eCommerce development. This gives further credence to the interactionism perspective this study pursues.

In general, from the existing studies of e-readiness with a national focus it is difficult to obtain a clear and theory based understanding of e-readiness and its impact on various facets of eCommerce.

3.4.2.2 Organizational focus

At the organizational level, in one of the early works, Wilson (1999) indicates that eCommerce readiness assessment will help to pinpoint some of the hurdles facing a company heading towards eCommerce. Wilson conceptualizes e-readiness as a four-dimensional construct constituted of *commitment, content, systems and developers readiness.*

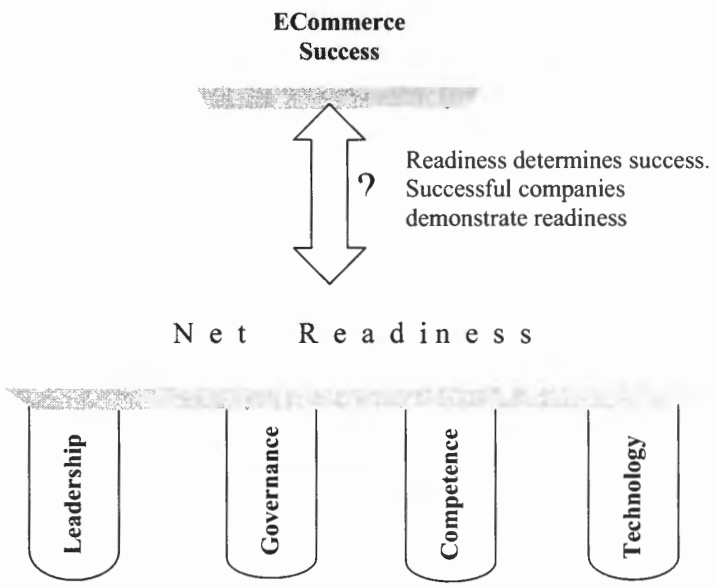
Although Wilson's work emphasizes the importance of assessing readiness and hints at its multidimensional nature, it is plagued with many flaws. First, eCommerce is narrowly conceptualized as merely selling through the web and most of the variables in the assessment tool are geared towards that. Second, the assessment tool is bereft of a theoretical framework. Both the score allocation and the final ranking seem arbitrary and may not provide any useful insight. But Wilson's dimension of "*content readiness*", although the specific variables refer to product information (database and photo) to be displayed on the storefront, is an interesting consideration. This indicates that readiness is not a static state to be assessed at the initial stage of the eCommerce growth lifecycle but as something that needs continuous assessment.

Hartman et al (2000) provide one of the most comprehensive works on e-readiness, although the term they use is "net readiness". According to Hartman et al, *Net Readiness is "a combination-unique to each organization of four drivers that enables enterprises to deploy*

high–impact Web-enabled business processes that are focused, accountable and measurable...it is a measure of a company's preparedness to exploit the enormous opportunities in the e-conomy landscape" (3-4). The four "drivers" (also referred by them as "pillars" of *Net Readiness*), are *leadership, governance, competencies, and technology.* Hartman et al argue that these four factors distinguish *net ready* organizations (the likes of Dell, Amazon, CISCO, etc) from others and determine an organization's capability to succeed in eCommerce. The authors claim to have developed the concept of *Net Ready* organizations by looking into what makes web-enabled organizations "successful".

According to Hartman et al (2000), achieving success in eCommerce requires "net readiness" and *net ready companies are* successful eCommerce players (Figure 3.8). Thus, net-readiness is both necessary and sufficient for success in eCommerce. Nonetheless, Hartman et al posit that, of the four pillars of net readiness, if one has to choose one of them to perfect, then leadership should be the candidate. This is because, they argue, *"except leadership, which is innate, the rest could be acquired, developed or purchased"*. Other authors (such as Morath, 2000; PricewaterhouseCoopers, 2000) have also suggested their own conceptualization of e-readiness and suffuse it with a list of indicators (see table 3.9 for a summary).

Figure 3.8 A Visual Impression of Hartman et al's Pillars of Net Readiness



Hartman et al also developed a *Net Readiness Scorecard or Internet Quotient (IQ)* on a five-point scale based on the four pillars of net-readiness in order to assist companies determine their ability to migrate to e-business successfully. Nonetheless, the authors have failed to explicitly define and pin down success to specific measures. Rather, success is intuitively considered and its relationship with *Net Readiness* is left open to speculation. However, the specific variables in their instrument give special attention to strategy, culture, resources and relationships.

Table 3.9 Summary of the Literature on Organizational "E-readiness"

Reference	Methodology	Constructs	Remark/key finding
Hartman et al (2000)	Non-empirical	Leadership, governance, competencies and technology	Net readiness is a critical quality required to execute in eCommerce successfully. Successful companies demonstrate the four "determinants" of readiness, which jointly determine the success of any company in the e-conomy.
Pricewaterho useCoopers (2000)	Non-empirical	Strategy, competence, processes, performance, systems, delivery operations, tax, legal, security	E-readiness assessment is used to help companies identify their e-business capabilities and map it to eCommerce maturity.
Morath (2000)	Non-empirical	Beliefs, values, strengths and offerings, partnership, diversification, staff	Organizations (both start ups and established ones) have to "know themselves" and conduct an assessment of their capability in terms of the checklists. Knowing oneself is one of the three strategic considerations to successfully run eCommerce.
Wilson (1999)	Non-empirical	Commitment, content, systems *and* developers readiness	Readiness assessment is used to uncover information to pinpoint hurdles the organization might face in its eCommerce engagement. Readiness is considered as a continuous process and not as a single stage
Mckay et al (2001)	Survey	Management support, IT & financial resources, perceived risk	Management support has the greatest influence on SMEs intention to adopt eCommerce
Van Akkeren & Cavaye (1999)	Multiple case study	Currently used level of technology	Organizational readiness and lack of it are rated as chief facilitating and inhibiting factors respectively
Tabor (2000)	Survey	IT, Strategy	Aggressive strategy is a stronger driver for electronic commerce

A few empirical studies have also investigated *organizational readiness* as a construct affecting various facets of eCommerce but mostly of eCommerce adoption (Mckay et al 2001, Tabor, 2000; Van Akkeren and Cavaye, 1999). The major limitation of these studies is that they do not reflect a comprehensive conceptualization of *organizational readiness* and as a result address only a limited repertoire of constructs. These include *management support, IT and financial resources, Perceived risk* (Mckay et al, 2001), *IT and strategy* (Tabor, 2000) and *currently implemented technology* (Van Akkeren and Cavaye, 1999). Interestingly though, the findings in these studies indicate that what each of these studies constructed as *organizational readiness* significantly affects intention to adopt eCommerce (Mckay et al, 2001); is identified as both facilitator (when present) and inhibitor (if missing) of eCommerce adoption (Van Akkeren and Cavaye, 1999) and differentiate adopters from non-adopters (Tabor, 2000). Except Tabor (2000), the other two studies are also focused on SMEs.

At the conceptual level, Hartman et al's (2000) work so far appears to be the only organized and systematic framework that treats e-readiness at organizational level. Empirically, only a few studies, with limited coverage both in concept and scope, have addressed it. Our study will benefit from Hartman et al's work. However, this study would deviate from their work on several points. First the study will attempt to ground the concept of e-readiness in established theories. Second, this study treats E-readiness from at least two levels -national and organizational. Third, this study targets developing countries and enterprises and will bring additional insights and considerations that are probably taken for granted in Hartman et al's work as dimensions and constructs of E-readiness. Third the study will attempt to empirically test the relationships between E-readiness and eCommerce success.

To summarize this section, the literature review thus far provides some background information on the concept of readiness in general and eCommerce readiness in particular. From the review, it can be learned that eCommerce readiness can be assessed at different levels such as the national and organizational. The review also indicates that eCommerce readiness is considered mostly as a necessary condition to eCommerce and its success. Nevertheless eCommerce success is neither sufficiently described nor its relationship with e-readiness explored. Before presenting our theory of eReadiness and eCommerce success in the next chapter, a review of the literature on eCommerce success is appropriate. The following section presents the results of our exercise.

3.5 LITERATURE REVIEW ON ECOMMERCE SUCCESS

The dependent variable in this study is eCommerce success. So far, there are no well agreed upon operational models and measures of eCommerce success, except perhaps maximum return on investment. In the absence of any reasonable and workable framework, it will be difficult to justify future eCommerce investments.

The information systems (IS) literature extensively addresses the concept of information systems success. Nonetheless, in more than 20 years of research, what exactly is meant by "IS success" has never been clear since the term was introduced to the discipline (Kanellis, 1999). A plethora of concepts and terminology such as IS effectiveness, efficiency, productivity, impact, etc., are used in the literature either as synonyms for IS success or sometimes with major differences (Delone and Maclean, 1992; Grover et al, 1996). Various theoretical models such as process, variance, causal, etc., have been implemented to explain IS success (Seddon, 1997). A number of criteria such as financial, economic, perceptual, behavioral; dependent, independent and contingent variables and measuring instruments based on these criteria have been used to assess IS success (Grover et al, 1996; Delone and Maclean, 1992; Grover et al, 1996). However, despite the large number of empirical studies on IS success, research to date has found little agreement among the numerous studies (Garrity and Sanders, 1998).

Success is also widely discussed in organizational change and business process reengineering (BPR) literatures. In organizational change, the success of the change program is assessed by the extent to which the program meets its goal and objective and satisfies the stakeholders (Schneider and Brief, 1996). In BPR, where research (see for example Raymond et al, 1998) is estimating 70% of the BPR projects as failures of some sort, success is a very controversial concept. Some use the *quality of work life* and the *benefits to customers* as the main dependent variables whereas others prefer more tangible results in terms of *financial gain*, *cost saving*, *productivity* and *process lifecycle improvement* (Raymond et al, 1998; Guha et al, 1997). In addition, a number of critical success and failure factors and inhibiting and facilitating variables are identified, but again research to date has found little agreement among the numerous studies.

Although the success literature is replete with inconclusive and fragmented results, it can nonetheless serve to draw important lessons relevant for this study. The first lesson is that

success is a multidimensional construct and any attempt to define it otherwise will be flawed both in concept and operation (Ballantine et al, 1998; Saarinen (1996). The second point is that success can be assessed at various levels such as system, individual, organizational, and economy (Grover et al, 1996; Delone and Mclean, 1992). What to assess and how to measure it depend on the level of analysis and the results from each level of analysis may not necessarily show causality. That means, for example, organizational level success may not necessarily accompany the success of the system or change program at the individual level.

Third, the different stages through which either the system or the change program passes through need also be considered in investigating success, as initial success may not necessarily guarantee sustainable success (Ballantine et al, 1998). This also has implications on the "what" and "how" aspects of success. For example, Ballantine et al (in Garrity, 1998) conceptualize IS success by separating success into three fundamental levels of *development, deployment, and delivery*. They further argue that filters act among these levels of success and contain influences that inhibit or encourage the success of the system at the next higher level. Saarinen (1996) also supports this same notion of assessing success as a multidimensional construct. The above lessons from IS success literature are very relevant in assessing eCommerce success as eCommerce systems demonstrate some commonality with information systems (See Molla and Licker, 2001). Following is the review of the literature that addresses eCommerce success more directly.

A growing number of studies are discussing eCommerce success at different levels such as system, individual, organizational and macro (Bakos, 1998; Gomory et al, 1999, Tuunainen, 1998, Fingar et al, 2000; Kenney and Curry, 1999, Hartman et al 2000. Likewise, some eCommerce researchers (such as Von Dran et al, 1999; Kim, 1999; Loiacono and Taylor, 1999) have focused on the system aspects of eCommerce success that establish the web presence of companies. Others (see Zhang et al, 2000) investigated the quality of the content displayed on the web system as distinct from the technical quality of the system. A growing number of studies (Henneman, 1999; Nielsen, 1999) are also focusing on the usability aspect of eCommerce systems while others (Han and Noh, 1999; Jones & Kayworth, 1999) focus on assessing the use level and the satisfaction of users and customers in interacting with eCommerce systems. A few studies (Schubert and Selz, 2001, Kardaras and Karakostas, 1999) have investigated the overall effectiveness of eCommerce systems and its impact on organizational performance. At the macro level, eCommerce success is addressed in terms of

diffusion and its economic and social development contributions (OECD, 1999a; Barua and Whinston, 1999; Tan et al, 1999)

In common with the IS success literature, three criteria can be identified in the literature that discuss eCommerce success at an organizational level. These are behavioral (usage), financial (return on investment) and perceptual (user satisfaction and perceived usefulness) (see Table 3.10 for a summary).

Table 3.10 Summary of ECommerce Success Research

Reference	Levels of success measure	Success criteria	Remark
Gomory et al (1999), Han and Noh (1999)	Individual (users)	Web Usage (Reach, Click through rate and conversion rate)	Usage in general is a poor indicator of success due to its inherent assumption that a system that is used most is successful and tends to regard infrequently used systems as failures. Usage indicators cannot be uniformly applied to all types of eCommerce models.
Han and Noh (1999); Jones and Kayworth (1999)	Individual	Users satisfaction	Besides the inherent problems involved in users satisfaction, defining the "user" of eCommerce site poses a challenge. Satisfaction is too limited a construct to capture the range of purposes of eCommerce. So far no eCommerce-specific instruments exists to measure satisfaction
Korper and Ellis (2000)	Organizational	Financial (ROI)	Inherent difficulties are involved in using ROI and estimating and quantifying benefits
Zhung (1999)	Organizational	Multiple criteria	Operationalizing and elucidating the various benefits is yet to be seen
Hartman et al (2000)	Individual & organizational	Multiple criteria	Suggest eCommerce success evaluation to include cost, growth, customer satisfaction, reach and operations. So far no measuring instrument to operationalize these criteria.
Fellenstein and Wood (2000)	System	Design Quality	Assess the success of eCommerce (web based storefront model) through the design quality of the storefront. This is a lower level eCommerce success limited in scope to one eCommerce model and design success may not necessarily lead to success at the individual or organizational level
OECD (1999a), Barua & Whinston (1999), Tan et al (1999)	National (macro level)	Diffusion of eCommerce, growth in revenue and employment	There is no distinction between diffusion of eCommerce technologies and eCommerce practices. The revenue and employment growth indicators are subject to double counting as a result of definitional problems

Although *Use and User Satisfaction* are the most widely used dependent variables in the eCommerce literature (Hartman et al 2000; Gomory et al, 1999; Applegate et al, 1999; Han and Noh, 1999; Jones and Kayworth 1999) standard and systematic criteria for assessing *Use* and *User Satisfaction* of eCommerce systems do not seem to appear (Molla and Licker, 2001). For example, existing *Use* metrics focus on using specialized software to calculate indices such as reach, hit, click-through rate, conversion rate and do not extend to identifying what really affects *Use*. In the same vein, there does not appear to be a comprehensive framework and/or model that integrate the various independent variables into *User Satisfaction*.

The applicability (at theoretical, conceptual, and practical levels) of "use" (usage, usefulness) and user satisfaction as success indicators is widely critiqued in the IS success literature (see for example Melone, 1990; Saarinen, 1996; Symons, 1991; Seddon 1997; Kanellis, 1999). When it comes to eCommerce, these success indicators face additional challenges (see for a detailed review Molla and Licker, 2001). First, there is the question of defining the user of an eCommerce site, consumers, employees, managers, other organizations, etc,. In addition, the whole notion of usage, that the more the eCommerce site is accessed the more successful it is, has a fundamental flaw. It disregards the importance of the benefit that is associated whenever the system is used, even if the system is not used very frequently (Symons and Walsham, 1988). Third, usage level might depend on the success of the marketing effort of the site and not necessarily to some intrinsic qualities embedded in the system or product or business. This is a new challenge that arises due to the idiosyncratic nature of eCommerce.

Moreover, depending on the model one has in mind, an eCommerce site has a number of purposes such as increasing consumer awareness of products (Haseman and Nazareth, 1999), promoting company image (Piturro, 1999), improving communications and interconnections (Tuunainen, 1998; Haseman and Nazareth, 1999), as a channel for conducting the entire transaction lifecycle (korper and Ellis, 2000; Hartman et al, 2000). Thus, "users", whenever they use an eCommerce site, may have a completely different interests and expectations and would be satisfied or dissatisfied for quite a number of different reasons. This means that user satisfaction could result in equivocal findings and hence it tends to serve a limited purpose (Molla and Licker, 2001).

Return on Investment (ROI) is also another eCommerce success indicator (Korper and Ellis, 2000). In addition to the inherent problems and difficulties involved in ROI (see for example, Symons and Walsham, 1988; Symons, 1991; Grover et al, 1994; Saarinen, 1996), relying on a single financial measure as a sole success indicator has been critiqued as myopic and could undervalue the whole range of non-quantifiable benefits that are associated with eCommerce. Moreover, findings of the case study conducted by Jones and Kayworth (in Haseman and Nazareth, 1999) indicate that none of the case organizations in their study used ROI and all have reported difficulty in applying ROI to eCommerce.

In addition to the three basic success criteria discussed above, there are a few emerging works that suggest multiple criteria approach in assessing eCommerce. For example, Zhuang (1999) argues that eCommerce success could be evaluated from six aspects. These include, increased consumer awareness of products, cost saving, increased sales of products both on line and off line, market intelligence, customer support and advertisement. Although Zhuang's proposition indicates the relevance of capturing eCommerce potential in evaluating eCommerce effectiveness, how to operationalize and elucidate these benefits are yet to be investigated.

Hartman et al (2000) also suggest that reasonable evaluation of eCommerce success should involve the evaluation of *cost, growth, customer satisfaction, reach and operations*. Table 3.11 summarizes the eCommerce success metrics proposed by Hartman et al. Although Hartman et al's work consolidates in one framework the fragmented success indicators, the relationships between these various criteria are not known. Moreover, the whole question of operationalizing these criteria still remains unanswered.

Licker (2001) and Licker and Motts (2000) pose one of the harshest criticisms of existing measures of success in relation to eCommerce in general and in developing countries in particular. Licker and Motts (2000: 116) note the following limitations in what they call supply-side push models of eCommerce success:

> *The criteria of success have little to do with customer needs and satisfaction. And there is little evidence that traditional supply side measures such as ROI are appropriate in any of the contexts of a developing technology (www), a developing business model (eCommerce) and a developing society .*

Licker (2001) further reiterates that existing models of success are based on models of commerce in which buying and selling are the sole "desiderate of commerce" and ignore other

ecological purposes of commerce. Of course many would deprecate the notion of success advanced by Licker and Motts and would argue, at the peril of sounding tautological, "if it doesn't make cents, then it doesn't make sense". Nonetheless, in view of arguments on the difference between "development" and "growth", Licker and Motts's criticism of existing measures of success, which can arguably be classified as growth focused models, deserves serious consideration.

Table 3.11 Metrics for Net Ready Enterprises

CRITERIA	METRICS
Cost Reduction	• Number of support calls; cost of call/revenue • Total marketing expenditures as a percentage of revenue • Cost per order dollar • Total dollars spent on Net ready initiatives
E-conomy Growth	• Online sales dollars • Number of transactions completed online • Online support sales dollars • Number of sales support transactions completed online • Number of E-selling pages viewed online
Customer Satisfaction and Reach	• Online customer satisfaction survey score • Numbers/percentages of return visitors • Site reach (number of new site visitors, registrants, etc)
Operations	• Most requested pages/site areas • Quality control metrics (percentage of server uptime, frequency of broken links, etc) • Compliance with look, feel, navigation, E-conomy policies

(Source: Hartman et al, 2000)

Few researchers address the success of eCommerce at macro (national) level. Two basic approaches dominate such national level discussions of eCommerce success- the diffusion of eCommerce and its economic contributions (OECD, 1999a; Barua and Whinston, 1999; Tan et al, 1999; Larsen and McGuire, 1998; Zwass, 1998). In terms of diffusion, the level and speed of eCommerce implementation by different players in the economy such as governments, business organizations, consumers, etc., are used as indicators of eCommerce success at the national level (Tan et al, 1999).

Behrendorff and Rahman (in Tan et al, 1999) note that the growth in the utilization of available eCommerce technologies, such as e-mail, electronic funds transfer at point of sale and internet access, can be used as indicators of national level eCommerce success. Some are in fact extending this discussion and consider global level diffusion of certain types of eCommerce technologies as surrogates to eCommerce success. The Mahajan and Peterson model for determining the rate of adoption is the most commonly used model to study such global level of rate of adoption (See Larsen and McGuire, 1998).

The economic contribution of eCommerce (the size and growth of the eCommerce sector) is also another indictor of success at a national level. Two criteria: the growth in eCommerce generated revenues and the growth in the eCommerce sector employment are used to depict the economic contributions of eCommerce (Barua and Whinston, 1999; OECD, 1999). One of the basic problems in such national level analysis of eCommerce success is defining what constitutes the eCommerce sector. Barua and Whinston, for example define the eCommerce sector (economy) as "*a collection of IP based networks, software applications, and the human capital that makes the network and applications work together for online business and agents (corporations and individual) who are involved in buying and selling products and services in direct and indirect ways*". Based on this conceptual framework, they divide the eCommerce sector into four layers of *Internet infrastructure, applications, intermediaries, and online transactions.*

OECD (1999a) on the other hand describes the eCommerce sector based on the dimensions of the level of electronic commerce activity into r*eadiness, intensity and impact.* Readiness refers to the infrastructure whereas intensity and impact are related to e-business and e-transactions respectively. Based on this framework, OECD recommends two sets of measures, one for the size of eCommerce activities and another for the impact of eCommerce activities. The size of eCommerce activities involves measuring e-transactions and e-business whereas measuring the impact of eCommerce activities includes the measurement of e-infrastructure in addition to the e-business and e-transactions.

Leaving the operational difficulty aside, the above two works indicate the conceptual level problems rooted in the conceptualizations of eCommerce that one has to face in measuring the size, growth and impact of eCommerce at the national level. So far, there are no international statistical frameworks or accepted definitions to follow and individual countries are handling the issue in a less structured way (OECD, 1999a). In addition, conventionally used measures widely accepted in the West such as tele-density and computer density, have been criticized as unyielding in the context (such as Africa) where communal values are high in the society (UNECA, 1999b).

Generally, existing research on eCommerce success is still in its infancy, lacks comprehensive frameworks, and suffers at times from a myopic and at other times inconsistent understanding of eCommerce and its benefits. Moreover, existing success models focus on the outcome evaluation and do not cover the success of the process. Nonetheless, from the literature review it can be surmised that eCommerce success is a multidimensional construct and attempts to define it otherwise will be flawed both in concept and operation. In addition, eCommerce success can be assessed at various levels such as system, individual and organizational. What to assess and how to measure depend on the level of analysis and results from one level of analysis may not necessarily show causality to the next level.

3.6 SUMMARY AND CONCLUSION

In the interest of placing this study within the existing body of knowledge, the literature review spanned a number of disciplines and research strands. The review attempted to cover pertinent literature in each of the areas that are considered to be relevant for this study. This section summarizes the key outcomes of the review process, which will form the scaffolding for the research agenda to be pursued in the subsequent chapters.

Understanding the context within which ICT innovations (including eCommerce) are constructed, implemented and used is an important issue that might contribute towards facilitating better implementation of and results from ICT. The literature documents enough evidence that describes differences between the developed and developing countries in terms of social, economical, political, cultural, and technological factors. These factors define and shape the context (environment) of developing countries within which organizations in these countries survive and thrive. However, it should be noted that no two developing countries are alike nor manifest the same feature and status of development.

In terms of how research in IT in general and eCommerce in particular addresses the differences in the context of developing and developed nations and its impact on organizations, an environmental determinism view appears to have formed the scaffolding of the knowledge base in the area. Review of the empirical and otherwise literature reveals that, to date, research is mostly limited to identifying the differences in the context of developing and developed countries and treating those differences as weaknesses and imperatives constraining all aspects of organizational life in general but the implementation and outcome of ICT in particular. Thus most studies work within the "external influence" perspective.

A few researchers divorce this dominant perspective. Their findings indicate that while it is relevant to recognize the context within which organizations in developing countries operate and implement IT, taking this context as an imperative to the extent of having a unidirectional influence on the wherewithal, propensity and innovativeness of organizations is not a tenable position. Working from interactionism and mixed influence perspectives, these studies have demonstrated that the relationship between organizations and their environment in developing countries should best be viewed as one characterized by co-influence and mutual adaptation. A complementary viewpoint presumes the environment as providing "niches" that organizations can exploit to their advantage and not necessarily and not always "constraints" that unidirectionally dictate their course of action.

One area where the environmental determinism view reigns without much contention is in the emerging eCommerce in developing countries research. The review indicates that most of what we know, perhaps understandably, is based on speculative arguments about the potential of eCommerce to enable developing countries to catapult themselves out of the shackles of poverty and underdevelopment by allowing businesses in these countries better access to markets, and by improving their efficiency, productivity and competitiveness. A few studies have also raised concerns that tones down the optimistic positions.

Empirical evidences, especially at the organizational level that either support or refute both sides of the claims are scarce. But the literature review on the benefits of eCommerce highlights the premises and theoretical explanations for some of the widely touted benefits. To get an understanding of the extent of eCommerce benefits for businesses in the developed part of the world, empirical studies were drawn. The findings appear to indicate considerable gaps

between expected and actual benefits of eCommerce. One reason ascribed for such poor performance of eCommerce is organizations' lack of eCommerce maturity.

The rest of the literature on eCommerce in developing countries appear to follow the same trend of identifying the multi-prong macro level challenges developing countries have to overcome in order to benefit from this "cool innovation"-eCommerce. One can however question the notion of developing countries addressing all these challenges satisfactorily in an imaginable space of time. The optimistic side of this argument dictates that one should look for the mutual and evolving adaptation among eCommerce, organizations and their context. This point of view recognizes the role organizations play in influencing their context while at the same time being influenced by it.

Nevertheless, research does not appear to address organizational level issues, neither consider their role in co-influencing the environment within which they operate nor explore the niches the developing countries' environment might contain. However, the literature review on eCommerce barriers indicate that national level issues are just one side of the whole story and according to some preliminary empirical studies their conduciveness is insufficient, but perhaps necessary, for the development of eCommerce.

Over the recent years, further descriptions of the contextual weaknesses of developing countries especially with respect to eCommerce took the form of e-readiness studies. Evaluation of the work in this area indicates both duplication of efforts and proliferation of assessment tools, of which no two are alike. So far, what the literature produced from this line of enquiry, are lists of macro-level preconditions for eCommerce and the relative standing of countries in terms of these preconditions.

Prescriptions that often run the risk of unrealism are also abundant. In addition, the conceptualization that appears to form the e-readiness literature and its implications to individual organizations seem to indicate e-readiness as a clearly defined first stage on the path to eCommerce. This notion completely disregards the mutual acclimatization and interactionism amongst the developing countries context, organizations, and eCommerce.

The existing e-readiness assessments identify the macro level constraints with which businesses in developing countries have to contend. However, it does not address to what

extent business organizations in developing countries are prepared to incorporate eCommerce into their operation; nor do we know how they perceive their external environment. Management literature is full of evidence that indicates the role of the perceived environment (and not necessarily the actual environment) in affecting organizational decisions and actions.

Moreover, from the review of the literature it is apparent that the migration to eCommerce might dictate certain paths. A number of stage-based models have been suggested to indicate how established organizations eCommercize, and leverage their internal organization and their external partnership. This notion is relevant for business in developing countries as they embark on eCommerce, interact with the environment through their deliberate or otherwise actions, contribute to its shaping and accumulate their learning. However, the assumption of linear transitions through the maturity models is an untenable position and precludes the possibility of leapfrogging. Nonetheless, the different stages and statuses of eCommerce maturity imply that e-readiness, like eCommerce itself should be viewed as a moving and evolving process rather than as a single and initial state in the eCommercizing panorama.

In light of our interest to investigate eCommerce at the organizational level, we have tracked the concept of readiness in the wider organizational and IS literature. This pursuit leads to some observations regarding the conceptual and operational constructs of readiness and e-readiness. It focuses mostly on the components, resources and capabilities of organizations. These attributes are touted to have impacts on eCommerce success.

A review of the literature on eCommerce success on the other hand stresses the need for assessing success using a multidimensional approach. However, except for a few non-empirical studies, the research in the area of e-readiness and eCommerce success especially from the developing countries perspective remains untouched, but perhaps not so after this study.

In summary, the following points deserve reiteration

- Much of the current knowledge of eCommerce in developing countries is based on speculative arguments about the potential of eCommerce.
- Similar to those that discuss IT in developing countries, the environmental determinism view appears to have pervaded what has been known so far. Most studies focus on

identifying the weaknesses of the national context. However, equally important issues regarding organizations in developing countries and their mutual adaptation and co-influence with eCommerce and the national context are generally ignored.

- Existing studies consist more of prescriptions and anecdotal descriptions without much thought to theory and analytical methods for studying the interplay between the context and organizations.
- The descriptive studies are often limited to a single case and there is a poor link to theoretical frameworks. As a result, it is untenable to generalize these findings to other settings.
- There is little conceptual and empirical research on eCommerce in developing countries at an organizational level. In particular, theory development and conceptual frameworks identifying e-readiness and its effect on eCommerce and its success in developing countries are still in their infancy

In concluding the literature review, we state the following propositions

- The developing countries' context cannot be left as a residual but should be considered as an essential component in the investigation of eCommerce. Therefore, eCommerce studies in developing countries that do not take into consideration contextual factors might not produce reliable and valid results.
- However, it is equally untenable to consider solely environmental constraints; take that as an absolute imperative affecting all aspects of organizational actions (including IT and eCommerce activities) and disregard organizational level issues.
- Organizations are in constant interaction with their environment and there is a mutual co-adaptation and influence between the organization and the context within which the organization operates.
- Therefore, an interactionism perspective would result in a better understanding of how the external environment (which should also be viewed as having "niches" and not only constraints) and internal organizational forces fuse to affect eCommerce, its adoption, development and outcome in developing countries.

Based on the above conclusions, the next chapter will propose the theoretical framework that forms the main thrust of this study.

CHAPTER FOUR

A THEORETICAL FRAMEWORK OF eREADINESS and eCOMMERCE SUCCESS

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CHAPTER FOUR

A THEORETICAL FRAMEWORK OF eREADINESS AND eCOMMERCE SUCCESS

> *"Our theories are the scripts; the world our stage; researchers the stage managers; and data the film of the players' performances. Our goal is to create excitement, sell tickets and satisfy the public" (Licker, 1999). "Theory offers standardized language to describe complex phenomena, allowing researchers to learn from each other... Researchers who ignore theories overlook a storehouse of valuable concepts and accumulated findings relevant to their interests" (Robey and Zmud, 1992:12)*

4.1 INTRODUCTION

The previous chapter spanned the state and status of the literature and identified the knowledge gaps that need to be bridged. Having done that, an elaboration of the conceptual framework and the main argument of this thesis can now be presented. In doing so, the thesis attempts to heed with diligence the calls echoed in the above excerpts.

The spread of eCommerce in different parts of the world shows significant variation (Palvia et al, 2002). Within the same national setup, while some organizations have moved early, and are aggressively engaged in making eCommerce a customary way of doing business or consider it as a reality, others are showing reluctance towards embracing eCommerce and rather still think of eCommerce as a hype or fad (April and Cradock, 2001). While some claimed to have significantly benefited from eCommerce (Barrenechea, 2001; Hartman et al, 2000) others report eCommerce benefit that is well below their expectations (NNI, 1999). Although recognizing these differences by itself is one thing, the challenge is to explain them convincingly.

This chapter starts by laying down the assumptions and the conceptual groundwork for the ideas to be pursued in this thesis. It then presents the theoretical framework that this study proposes to guide the empirical investigation. The empirical model will be derived from the theoretical framework and its constructs will be discussed by drawing from the "storehouse of valuable concepts accumulated" in prior research. Preliminary hypotheses are also presented. The chapter ends with a summary leading to the methodological issues, which will be addressed in the next chapter.

4.2 THEORY PRELIMINARIES

Because eCommerce is an emerging discipline, it is not yet marked by its own accepted paradigms and sub-fields. Rather, eCommerce touches a variety of disciplines such as law, information systems, organization and management science, marketing, computer science, etc. Therefore, it is instructive that an investigation of eCommerce draws from these referent disciplines in order to benefit from conceptual, theoretical and empirical developments in these areas. For example, Wigand (1997) identifies five theoretical approaches through which one may view electronic commerce. The approaches are *transaction cost theory, marketing, diffusion, information retrieval and strategic networking.* This section lays down the conceptual basis and some assumptions that set the stage for the theory to be pursued in the study. These include the treatment of eCommerce as an innovation; the position the study takes on the interplay among the environment, the organization and eCommerce, and organizational and contextual theoretical frameworks that can be used to ground the current work.

4.2.1 ECommerce as an Innovation

Following Travica (2002); Kendall et al (2001), Lawrence (2001), Scheepers (1999), Dos Santos and Peffers (1998), Larsen and McGuire (1998), Wigand (1997), Damsgaard (1996) and many others from the organization and IS research stream (such as Licker, 1997; King et al, 1994; Swanson, 1994) this thesis considers eCommerce as a special case of innovation. This section elaborates this position. The main purpose of the discussion to follow is to be able to use innovation research as one of the referent disciplines (see for example Wigand, 1997) in supporting the theoretical framework to be proposed later in this chapter.

4.2.1.1 Background

INNOVATION is defined as ideas or objects that are new (Rogers, 1983) or are perceived as new (Rogers, 1995; Brancheau and Wetherbe, 1990). Inevitably, different researchers promote different connotations of INNOVATION. One strand of difference among prior research emanates from the perturbations caused by the concept of newness vis-à-vis what was there before or the *precursor* (Greve and Taylor, 2000; Thiruvenkatam, 1999; Licker 1997). Some consider INNOVATION to have to be radically different from its precursor (Greve and Taylor, 2000; Davenport, 1993). Others submit as INNOVATION even if what is "new" is incrementally different from the *precursor* (Corea, 2000; Cooey, 1998; Straub, 1997). For the former, any "newness" which is incrementally different from the precursor is *IMPROVEMENT* and not *INNOVATION* (Davenport, 1993). However, from Rogers's (1983 and 1995)

conceptualization, it can be surmised that the newness in the innovation should be treated with respect to the context (organizational, social or individual) within which the innovation is to be discussed. For example, for most citizens of the developed world, the telephone no longer represents something new. But to the other population of the world, which has never made a single telephone call, the telephone is indeed very new, and probably represents a major innovation (see also Rogers, 1995:11).

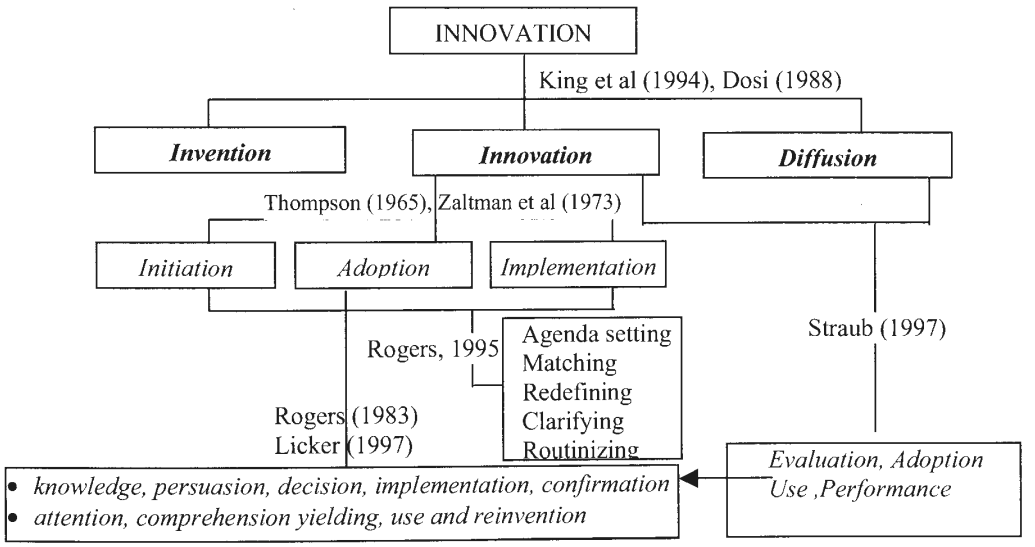
An explanation that provides some clarity on the concept of "newness" in an INNOVATION is to view it as a process of movement through three overlapping stages: ***invention***, ***innovation***, and ***diffusion*** (King et al, 1994; Dosi, 1988). Whereas ***invention*** is a new idea or product with or without immediate economic value, the process of *moving* the *invention* into a *useable form* and the *spread* of the capacity to produce and/or use an innovation and its use within a social system represent ***innovation*** and ***diffusion*** respectively (King et al, 1994). Literature also exists that treats ***Invention*** as "primary INNOVATION" and *innovation* as "secondary INNOVATION" (Corea, 2000; Thiruvenkatam, 1999).

With respect to organizations and their members, ***innovation*** is argued to represent a number of processes. In Swanson (1994), Daft (1978:197) defines *innovation* as "*the adoption of an idea or behavior that is new to the organizations with similar goals*" and Thompson (1965) proposes a three-stage model of the ***innovation*** process: *initiation, adoption and implementation.* Zaltman et al (1973) also suggest an organization-oriented innovation process model that combines Thompson's last two stages into one and that consists of *initiation and implementation.* Rogers (1995:392) extends the two stages and conceptualizes five stages of the *innovation* process in an organization as *agenda-setting, matching, redefining/ restructuring, clarifying, and routinizing.* On the other hand, Rogers (1983, 1995) also suggests five basic stages of the *adoption* of *innovation* by individuals as *knowledge, persuasion, decision, implementation and confirmation.* Licker (1997) refers to these stages as *attention, comprehension, yielding, use and reinvention.* The above five works are complementary rather than contradictory to one another and reflect the level of analysis that the authors deal with, organizational vs. individual.

Straub (1997) suggests a phase-based model that covers both the ***innovation*** *and* ***diffusion*** processes. Straub argues that ***innovation diffusion*** passes through several phases that involves from *evaluation* through *adoption* to *use* and finally *productivity and benefits.* While the first

three stages of Straub's model can be traced in the models discussed above, as we will see later, the inclusion of *productivity benefits* as one phase of ***innovation diffusion*** is an interesting dimension to the purpose of this study. In addition Straub (1997) proposes and produces supporting evidence that different factors (and sets of theories) explain each phase of *innovation diffusion*. Figure 4.1 represents a visual impression of the discussion that has transpired in the above paragraphs. In the remaining part of the text, our use of the term "innovation" would preclude ***invention*** and the focus will be on ***innovation diffusion***. Moreover, because of the advantages discussed above, this thesis subscribes to Straub's (1997) model and henceforth, unless stated otherwise, the term *innovation diffusion* (with italicized convention) should reflect Straub's (1997) conceptualization.

Figure 4.1 A Summary of Different Conceptualizations of INNOVATION



4.2.1.2 Taxonomies of innovation

Several taxonomies of innovation are documented in the literature. The most common classifications are administrative vs. technical (Rogers, 1995; Swanson, 1994; Robey, 1986); and product vs. process (Corea, 2000; King et al, 1994; Davenport, 1993; Zmud, 1982). Institutional and sociological theorists also describe innovation as a network phenomenon and further distinguish between innovations that are, and that are not network technologies (Scott, 199; King et al, 19994).

Innovation is also considered as a social reform such as democratization (King et al, 1994). A distinction is also documented in the literature between organizational and information technology innovations (Swanson, 1994). Swanson identifies three types of IS innovations:

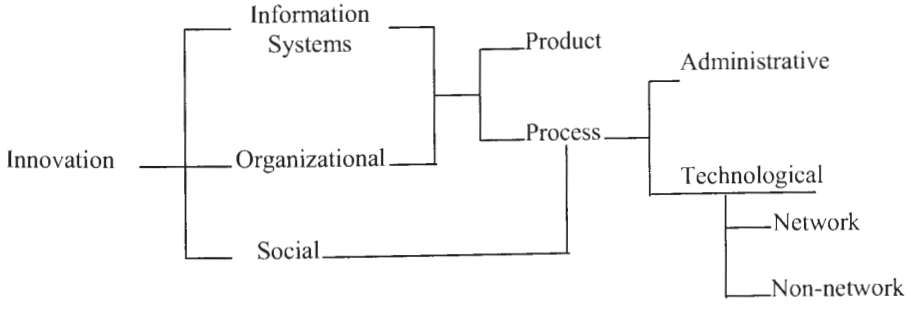
Type I, II and III. Type I innovations are confined to the IS task, Type II to supporting business administration and Type III are embedded in the core technology. Table 4.1 provides a summary of the different taxonomies of innovations.

Table 4.1 Taxonomies of Innovation

Reference	Classification
Robey (1986) Rogers (1995)	New products or services Administrative innovation Technical innovation
King et al (1994) Scott (1991)	Network based Not network based
Swanson (1994)	Organizational IS Innovation (Type I, II, III)
Thong (1999)	Product vs. Process Radical vs. Incremental Planned vs. Incidental
Zmud (1982) Davenport (1993)	Product innovation Process innovation

The different classifications of innovations described in Table 4.1 are not mutually exclusive and a certain structure (at least classificatory if not conceptual) can be envisaged. Working from an IS perspective, innovations could be classified as social, organizational or information systems. IS and organizational innovations could be of product or process nature whereas social innovations reflect process innovations. A process innovation on the other hand could be administrative or technological and technological innovations would be either network based or non–network based. Figure 4.2 captures this structure.

Figure 4.2 A Classificatory Tree of Innovation Taxonomies



This thesis does not attempt to scrutinize individually the various streams of classifications of innovation and identify their conceptual flaws. Rather, we argue that eCommerce, in the sense

that it is conceptualized in this study, defies any of the classifications in the prior literature and shares the features of almost all of the classifications. The quasi-hierarchical framework pursued in this study gives credence to this position.

4.2.1.3 eCommerce innovation

In its roots, eCommerce can arguably be considered as a technological innovation (Treese and Stewart, 1998; Zwass, 1998; Zwass, 1996). In this sense, it shares the features of all technological innovations. The basic technology in eCommerce is network based. The network is platform independent and interconnects not only organizations in a limited geographical area but also the entire globe to the extent of dismantling physical boundaries and giving rise to *Network Generations* (Tapscott, 1998) and *network societies* (Castell, 1996). A myriad of applications (information systems) operate over the network and are used to enable, change and drive business processes and create new forms of products, thus eCommerce is also a process and product innovation (Afuah and Tucci, 2001; Morath, 2000).

Ecommerce is also about enhancing, building and maintaining interactive relationships (of mainly electronic in nature) within the organization among different departments and employees and outside the organization with customers, government, suppliers and the general public (Truman, 2000; Riggins and Rhee, 1998; Zwass, 1998). Therefore, it can also be considered to represent an administrative innovation. One should not also forget the fact that eCommerce gave rise to a new breed of business, the dotcoms, and business personas that turned into millionaires, at least a few of them, overnight.

eCommerce can also be argued to represent a social innovation (Fellenstein and Wood, 2000). It precipitates changes, perhaps of a *morphogenic* nature, in the way society communicates, creates wealth, entertains, works and shops. It is touted to represent the "*big thrust in a quest to make our lives better, simpler and more productive*" (Ferraro, 1998). Already, Amazon has revolutionized retail shopping forever. An anecdotal experience of a small eCommerce venture in Ethiopia, ethiogift.com, also gives some credence to this. Before ethiogift.com, buying a Goat from the Internet was not an idea that one could easily entertain, not so when the marketing literature is suffused with product development strategy tips.

Some also argue that the Internet in general and eCommerce in particular has led to the rise of the *Net Generation* (Tapscott, 1998) and *network society* (Castell, 1996) where economy,

commercial and individual success are presumed to be the functions of *Access* (Rifkin, 2000). The *Net Generation* thinks, learns, plays, communicates, works and creates communities in the network and in the ways that are so different from the pre-Internet generation (Tapscott, 1998). While this can be a remote possibility to the majority in the developing part of the world, it does not however preclude those in the urban areas of the developing world, *the elites*. Closer to home, a much-publicized South African *dotcoza* project (a youngster initially with a shirt and slack; locked in an empty room with only an Internet connection to the outside world and who lived for three months from the Internet and eCommerce) is a case worth reciting here. This might indicate how the future society, with its reliance on the Internet technology, albeit unevenly, could be different from the present day society.

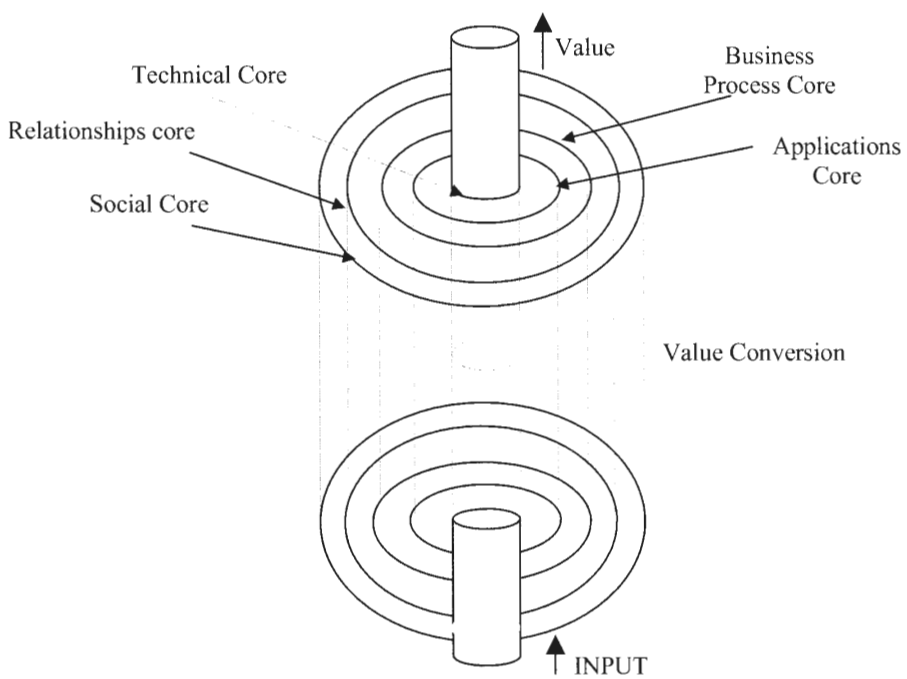
eCommerce also represents an evolving and continuous process of innovation (Kalakota and Robinson, 1999) perhaps with characteristics of *organizational and social process of improvements* (King et al, 1994; Davenport, 1993). One thing we can learn from the eCommerce maturity models is that the potential of this "cool innovation" is being unbundled in various shapes and forms. In less than a decade, eCommerce has evolved from being just another marketing tool (Kalakota and Whinston, 1996; Wigand, 1997) to something of strategic importance (Barrenechea, 2001) that can affect not only the competitiveness of organizations (Hartman et al, 2000) but also of nations (Sprano and Zakak, 2000; Penbera, 1999), and their overall development and the success of the global economy (UNCAD, 2001; The World Bank, 2001). Many submit that we are just at the beginning of the e-*r-e-volution,* " *e"* or *"r"* depending on how one wants to see it (Kampas, 2000; Drucker, 1999; Treese, and Stewart, 1998).

Innovation types are premised to be important because facilitation factors vary among innovations (Rogers, 1995; Swanson, 1994). Previous studies have investigated a number of innovations that can be grouped in one of the categories listed in Table 4.1 (See Rogers, 1995 and Swanson, 1994). If eCommerce, as argued above, defies such classifications, then this means that previous studies might not suffice to explain what affects the adoption and diffusion of eCommerce. Of course many previous studies have focused on one or the other layers of eCommerce such as the technical or business model or the application layer. But such knowledge might therefore not be considered to satisfactorily explain eCommerce in its complete sense, or at least in the sense it is conceptualized in this study. This argument can best be stated from a systems theory perspective. The concept of *emergent properties* in

systems theory posits that when the components of a system merge together and form a whole (*synergism*), the whole (the system) manifests new properties, which may not necessarily be the property of any of the components that make the system (Mcwhinney, 1992). A classical example is water, which is a combination of two units of hydrogen and a unit of oxygen, with properties that neither of its components demonstrates.

The above discussion obviously leads to a position that eCommerce as an innovation requires a taxonomy on its own right, akin to the IS innovation taxonomy developed by Swanson (1994). While this is tempting, this thesis will not pursue the agenda here and rather put forward the challenge for future research. This is because our emphasis here is to justify the position of the thesis in considering eCommerce as an innovation. However, attempting to develop comprehensive eCommerce innovation taxonomy requires a detailed study in its own right. Nonetheless, we are not going to leave the issue without a recommendation, albeit a crude one. Following Daft's (in Swanson, 1994) dual core model, which is updated in Swanson (1994) as a tri-core model, we envisage a Penta-core model of eCommerce innovation that is consistent with the quasi-hierarchical framework introduced in Chapter 2. Figure 4.3 represents what we have in mind and we hope that it will serve as a springboard for future research.

Figure 4.3 Towards a Domain of eCommerce Innovation: A Penta-Core Representation



(Source: Based on Swanson, 1994)

The discussion thus far attempted to provide the argument of the thesis in considering eCommerce as a special case of innovation; special because it defies prior classifications of innovations. In fact some consider eCommerce as a *"disruptive innovation"* (Drucker, 1999) causing *"organizational and technological discontinuity"* (Barrenechea, 2000; Hartman et al, 2000; NNI, 1999).

From the discussion that has transpired so far, it can be construed that the position of this thesis to consider eCommerce as an innovation is very tenable and the evidence and arguments presented above are credible. The purpose of the above exercise and the ones that are to be discussed below is also to be able to use innovation research as one of the pillars to support the quest of the thesis to address the research questions. A brief tour of the innovation research is therefore what we will be doing next.

4.2.1.4 Innovation research

Despite vast literature, studies on organizational innovation research are criticized as *inconclusive, passé, inconsistent and characterized by low levels of explanation* (Thiruvenkatam, 1999; Damsgaard, 1996; Rogers, 1995; Wolfe, 1994). Wolfe (1994) identifies three discernible streams of innovation research at organizational level: "diffusion of innovation" (DI), "organizational innovativeness"(OI), and "process theory" (PT). Other complimentary classifications are also suggested in Thiruvenkatam (1999). However, Wolfe's (1994) work appears to be comprehensive in terms of the details with which each of the streams is described and discussed. Table 4.2 summarizes the key features of these classifications.

As can be surmised from table 4.2 organizational innovation research has focused its level of investigation by taking the organization as a primary unit of analysis. However, IS innovation research appears to cover additional ground. For example, innovation diffusion, in the sense of the spread of a particular innovation within the social context, has been the focus of much IS research. Some seek to understand it on an organizational use basis; others seek an industry level analysis. A few seek to understand it by dissecting the process on a national level (for an extensive summary see Damsgaard, 1996).

Table 4.2 Distinguishing Features of Innovation Research

Criteria	Research Stream			
	Diffusion	**Innovativeness**	**Process- A Stage**	**Process B-process**
Research Question	What is the pattern of diffusion of an innovation in a population of adopters?	What determines organizational innovativeness?	What are the stages organizations go through in implementing innovation?	What factors explain the chain of events, which result in innovation implementation?
Focus (Ref. Fig 4.1)	Adoption	Adoption or Implementation	Adoption through implementation	Adoption through implementation
Unit of Analysis	An innovation	Organization	Innovation process	Innovation process
Independent Variables	Organizational characteristics Innovation characteristics Promoter characteristics	Organizational characteristics Innovation characteristics Managerial characteristics Environmental characteristics	Innovation characteristics	PRECURSOR Organizational Context Strategy, structure, resources, technological strength Organizational politics
Dependent Variable	Diffusion pattern, extent and rate	Number or speed of adoption	Stage existence and/ or sequence	OUTCOME The innovation process, its stages, sequences, divergent and parallel paths, feedback and feed forward cycles.
Research Model	Logistic growth model	Variance/regression models	Stage models	Process models

(Source: Wolfe, 1994: 413)

IS Innovation is also often discussed in terms of the time the context (individual, organization and social) took to use the innovation (Swanson, 1994; Wolfe, 1994). In this line of thought, only early adopters of an innovation are considered as innovators (Swanson, 1994; Rogers, 1983). This view is considered as very narrow in light of some innovations, such as communication technologies, that are continuously evolving (Swanson, 1994). In addition, we argue that when an innovation represents a *cluster* that is in a state of continuous change, and not a single identifiable innovation, reliance on early adopters only to represent innovation might not produce a useful perspective of investigating the innovation.

Another line of enquiry in IS innovation research, that will be pursued in this thesis, is the locus and factors of influence that affect *innovation diffusion* (innovation diffusion in Straub's (1997) sense. Such research solicits factors that are responsible for the successful adoption and implementation of IT. Four perspectives are promoted: organizational imperative (internal influence/organizational choice), technology imperative (features related to the technology), environmental imperative (external influence/environmental determinism) and interactionism (mixed influence) (Rogers, 1995; Lakhanpal, 1994; Orlikowski, 1993; Orlikowski and Robey, 1991; Orlikowski and Baroudi, 1991; Rogers, 1983; also Table 3.6 in Chapter 3).

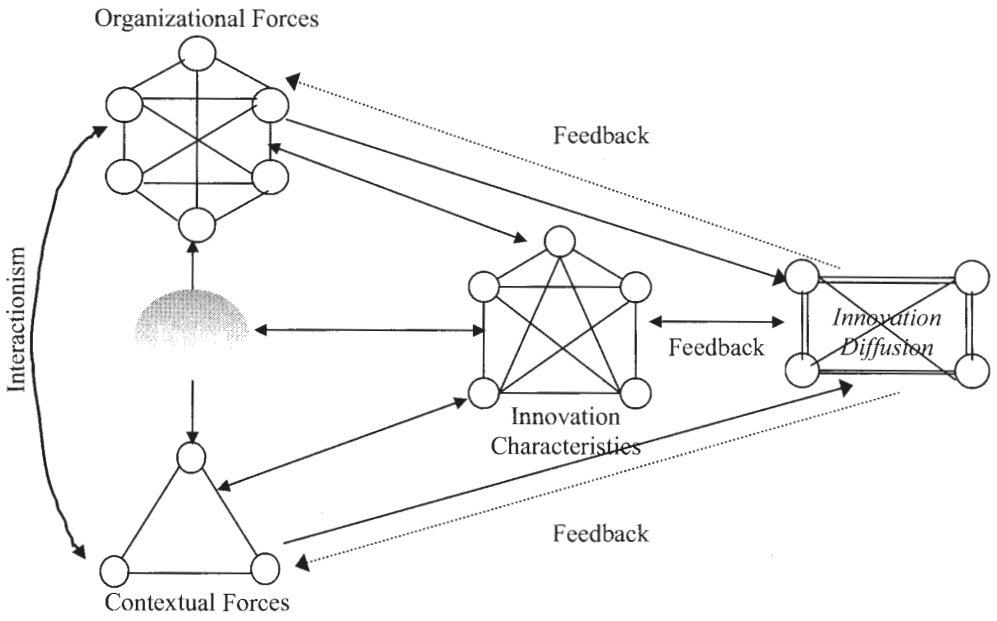
Except for the interactionism perspective, the others focus either on the technology or the organization or the environment only. Interactionism, however, enables to treat all the three forces and their interaction in one dynamic framework. In this study, based on the conclusion we have reached after the literature review, and the obvious advantage of the interactionism perspective just mentioned, we advocate the interactionism perspective.

4.2.2 The Interactionism Perspective

Working from an interactionism perspective, it can be posited that *innovation diffusion* (in the sense it is used by Straub (1997)) is affected by the dynamic interaction among the organization and its environment. While the external environment can present a blend of constraints and niches, the internal organization's capacity would also determine how an organization would be able to respond to such forces. A third factor into the equation is the innovation. The characteristics of the innovation and its requirements on both the external environment and the internal organization might also influence the interaction.

Therefore, working from an interactionism perspective, it can be proposed that the organizational forces, external environment and the characteristics of the innovation and their fusion might affect the *diffusion of the innovation* (Orlikowski, 1993; Levy and Merry, 1986). In addition, there is a reciprocal relationship and mutual co-adaptation among the three such that the very organizational and environmental resources and conditions on which organizations draw in implementing an innovation can at the same time be the basis for shaping their internal and external environment to facilitate the "continuous process of improvement" (Coppey et al, 1998). Figure 4.4 represents a visual impression of our conceptualization of the interactionism perspective.

Figure 4.4 Conceptual Model of the Interactionism Perspective



(Source: Adapted from Levy and Merry, 1986)

We argue that looking at eCommerce *innovation diffusion* in developing countries from the above perspective brings an alternative approach to the dominant environmental determinism perspective that is inherent in the current research by giving equal emphasis to both organizational and environmental issues. Interactionism is a useful framework to explain why organizations that operates in the same environment/ context show different performances and propensity to adopting an innovation (Montealegre, 1999b). In addition, it also allows deciphering why certain kinds of innovations are successful in a given organization while other kinds of innovations are not so successful.

A number of studies have adopted the interactionism perspective in their investigation. In the IT and developing countries research, the most notable ones are Montealegre (1999a, 1999b, 1997), Jarvenpaa and Leidner (1998) and Barrett and Walsham (1995). The perspective can also be traced (though sometimes not labeled as such) in the investigation of the adoption of technologies and resultant organizational changes (Orlikowski 1996, 1993) information systems evaluation (Symons, 1991), organizational transformation (Orlikowski, 1996;

Moreton, 1995; Levy and Merry , 1986), IS and EDI success (Raymond and Bergeron, 1996; Raymond, 1990) organizational use of microcomputers (Lakhanpal, 1994). What can be learned from these various studies is that the perspective has been used to guide research in both positivist and interpretivist researching paradigms.

Some researchers (such as Orlikowski, 1993; Orlikowski, 1996) follow a longitudinal study covering a period of two to four years to identify changes (both in the internal and external context) that occurred diachronically during the interaction among the technology, the environment and the organization and how that affects the *innovation diffusion* process. Others (such as Raymond and Bergeron, 1996; Lakhanpal, 1994; Raymond, 1990) use the perspective to identify factors that affect the *innovation diffusion* synchronically. This thesis (as will be justified in the next chapter) is related to the latter group.

The interactionism perspective allows conceptualizing *innovation diffusion* as a function of the fusion of internal organizational and external environmental forces. The next section discusses the theoretical and conceptual groundwork for deciphering organizational and environmental factors to support the main thrust of this thesis.

4.2.3 Theoretical Legs

Our primary interpretive lens in discussing the theoretical frameworks that provide the scaffolding for this thesis is the relevance of the theories to helping us understand the idiosyncrasies of the organizational and environmental contexts of developing countries while at the same time using "*standardized language to describe* [a] *complex phenomena*". In so doing, as Robey and Zmud (1992) succinctly state we hope to minimize the peril of "*overlooking a storehouse of valuable concepts and accumulated findings relevant*" to our interest and to contribute towards the mutual learning among researchers. The theoretical legs to be discussed in this section include the sociotechnical system and resource based theories (section 4.2.3.1) and institutional and competitiveness theory (section 4.2.3.2).

4.2.3.1 Organizational

There are many models for analyzing organizational systems. Some are limited from the outset because of their undue emphasis on either the technical or social aspect of the system but not both. A model that has received wider acceptance both in the management, organizational change, innovation, development and information systems literature is the socio-technical

system theory of organization (Corea, 2000; O'Hara et al, 1999; Appelbaum, 1997; Leavitt; 1965; Trist and Pollack, 1963).

Socio-technical system (STS) theory is an extensive body of conceptual framework underlying the introduction of innovations into organizations. The theory is based on the premises that an organization is a combination of social and technical parts and that it is open to its environments (Trist and Pollack, 1963). Based on this theory, Leavitt (1965) proposes that organizations can be viewed as the interaction of four highly interrelated attributes: *task, technology, structure and people*. This basic model has been modified and enhanced to best describe the essential elements that constitute the modern day organizations. One such notable effort, with wider acceptance in the IS literature, is the model of *the MIT framework for the management in the 90s* proposed by Morton and Rockart (in Delsi, 1990). This model expands Leavitt's components by including *culture, strategy and processes*. Delsi (1990) further expands the MIT framework by considering *leadership* as an additional element (see also Guha et al, 1997; Shani and Senn, 1994).

The underlying thesis of the STS is that organizational performance hinges on how well the social and technical systems of the organization are designed and collectively tuned to provide the organization with an overall capacity to proactively interact with the environment (Corea, 2000; Trist and Pollack, 1963). STS is also a useful framework to understand why an organization's results are what they are and how the integration of the social and technical system leads to improved results (Shani and Senn, 1994). In the STS framework, organizational performance is perceived as a function of the firm's business environment and its interface with the technical and social systems and the governing model that integrate the three (Shani and Senn, 1994).

STS pays due consideration to the human side of the organization, without neglecting the technical system. STS also recognizes the interaction among the social and technical systems of the organization and the environment and is consistent with the interactionism perspective. Most of the literature on IT in developing countries suggests social issues as one of the chief challenges in the implementation of IT (see for example Jayasuriya, 1999; Montealegre, 1997; Robey et al, 1990). By using the STS as one of the theories to inform our investigation, we hope to address this particular challenge. In short, STS implies that one can study organizations from the points of view of the organizational process that must be included;

organizational structure that must be in place; the (information) technology that must be available; and the social and cultural assumptions in the organization, etc.

This thesis argues that the socio-technical system theory provides a basic language and analytical framework for a fair investigation of an organization in terms of its social and technical components. However, because one of the most widely referred to challenges of organizations in developing countries is a lack of resources, this thesis hopes to give due consideration to this challenge as well. Therefore, we draw from a second theory-resource based view- to complement the socio-technical system theory as one of the referent theories to support the main thrust of the thesis.

The Resource based view (RBV) is widely used in the field of strategic management to answer some fundamental questions of business strategy such as*: What makes some firms different from others? Why are some firms profitable and competitive while others are not?*. RBV (also sometimes known as resource based theory (RBT)) rests on the premise that resources differentiate firms in fundamental ways and affect the ability of value that an organization can create (April and Cradock, 2001; Collis and Montgomery, 1997; Hall, 1997; Jarvenpaa and Leidner, 1997; Barney, 1991). RBV also posits that organizational performance differs because each firm possesses a bundle of idiosyncratic, valuable, non-substitutable, and imperfectly imitable resources (Collis and Montgomery, 1997 ; Hall, 1997). Such resource heterogeneity, as the general concept is called, whether by history, accident or design, is considered to be responsible for the successful performance of firms, the variability in their performance and for attaining sustainable competitive advantage (A comprehensive review of RBV literature is provided in April and Cradock, 2001).

The empirical research on competitive advantage provides strong support for RBT as a prevailing paradigm for explaining variation in organizational performance (April and Cradock, 2001). Our primary emphasis here is not to prove or disprove whether RBT is a valid theory in explaining sustainable competitive advantage but rather to use its explanatory power as a framework in understanding the resources of the organization and its effect on eCommerce success. Hence we are working mainly from a "resource necessity" point of view (April and Cradock, 2001; Collis and Montgomery, 1997). Because many of the resources cannot be accumulated instantaneously (Collis and Montgomery, 1997), an organization's activities can

be expected to depend on the current stock of resources, or access to them and the speed by which the organization can accumulate new ones.

Resources may take different forms- from common factor inputs that are widely available and easily purchased to highly differentiated resources like brand names and organizational capabilities that are developed over many years. Generically, resources could be classified as tangible assets, intangible assets and organizational capabilities (Collis and Montgomery, 1997; Hall, 1993). Tangible assets include real estate, production facilities, and raw materials. While company reputations, brand names, culture, technological knowledge, patents and trademarks form intangible assets; organizational capabilities refer to the combination of assets, people and processes that organizations use to transform input to outputs and include competencies such as trustworthiness, organizational flexibility, rapid response to new customer trends, short product lifecycle, etc.

The thesis argues that the above two theoretical frameworks can provide one of the pillars for building the theoretical framework and for substantiating the hypotheses to be pursued in this study. Nonetheless, because interactionism also demands analysis of the context external to an organization, in the following sections we will try to lay the conceptual groundwork for assessing the environment.

4.2.3.2 Environmental

What is normally referred to as the "national context" is subject to many interpretations and analyses and may include a bevy of factors like the political climate, the socio-economic environment, technology, and culture. Making a meaningful analysis of the national context or the factors that make the national context, without being bogged down by their complexity is a very challenging and daunting task. Such an analysis requires a systematic approach, which while providing useful insight should as well enable the management of the problems arising out of the complexity of making such an investigation.

There are various taxonomies in describing the environment. Organization and management literature defines the environment into *direct* and *indirect* (Patching, 1999). Direct environment refers to the members of the value chain and includes suppliers, competitors, customers, creditors, etc., and it tends to be relatively specific to an industry. Indirect environment on the other hand refers to the general socio-economic and political and cultural forces that prevail in

a specific country or region. Yap (1990) refers to the former as *specific* and the latter as *general*. On the other hand, Munene (1995, 1991) differentiates between *exchange* and *institutional* environment. While the exchange environment is related to the direct (specific) environment, the institutional environment refers to the rules, regulations, norms and general expectations that operate in a given country. In Oxley and Yeung (2001), Davis and North (1971) define the institutional environment as the "set of fundamental political, social and legal ground rules that establish the basis for production, exchange and distribution". Institutional theories (such as institutional economics) connect the characteristics of the institutional environment to the growth of business in a nation-state in general (Oxley and Yeung, 2001) and to the diffusion of ICT in particular (Montealegre, 1999a, King et al, 1994).

Porter (1990) provides one of the most comprehensive and empirically supported frameworks for analyzing the role and importance of national circumstances that define the environment within which firms survive and thrive. On the basis of Porter's (1990) analytical framework, five broad attributes shape the environment. These are *demand conditions, factor conditions, supporting and related industries, firm strategy, structure and rivalry and government.* Demand conditions refer to the nature of demand for an organization's (industry) products or services. Factor Conditions refer to a nation's position in factors of production such as skilled labor or infrastructure, necessary to compete in a given industry. Related and supporting industries on the other hand are related to the presence or absence in the nation of supplier and related industries that support and facilitate an organization's initiatives. The conditions in the nation governing how companies are created, organized and managed and the nature of domestic rivalry underlies the strategy, structure and rivalry dimension.

Porter (1990) suggests that governments, through their policies, rules and regulations, play important roles in influencing (and be influenced by) the demand and factor conditions and the circumstances of supporting industries and firm rivalry. This role of government is similar to what institutional theories envisage. However, Porter (1990) recognizes governments' role in affecting national circumstances as a major user of technology such as telecommunication. Porter's framework also highlights the importance of cultural factors and political history but suggests that these forces work through the other determinants of the national environment and not in isolation from them. In a recent work, Afuah and Tucci (2001) discuss how such environmental factors affect the performance of organizations and an industry.

This study will benefit from the explanatory power of the above theories in investigating the context within which organizations in developing countries operate. In addition the theories make tenable hypotheses that relate the environmental context to *innovation diffusion* as postulated in the interactionism perspective.

4.2.4 Theory Preliminaries Summary

In summarizing the preliminary discussion that has transpired in the preceding sections, the following points are reiterated.

eCommerce is a complex and context sensitive process of innovation. As a complex innovation, that defies previous taxonomies, it demands certain requirements from the context within which it is to be diffused. The contexts are both organizational and environmental.

An interactionism perspective posits that the fusion of organizational and environmental factors coupled with the characteristics of eCommerce would affect *eCommerce diffusion*. The *diffusion of eCommerce* can be modeled as a process that passes several phases from evaluation through adoption to implementation and finally of productivity and benefits. Each of these phases might be affected by a combination (perhaps unique) of organizational and environmental forces.

The sociotechnical system and resource based view theories can provide the framework to decipher the organizational context. The environmental context on the other hand can be analyzed using frameworks from institutional theories and Porter's theory of competitiveness. These theories are chosen because of their explanatory power as a tool to address social, technical, political and economical realities in developing countries and their organizations.

With this background, the next section will introduce the theoretical framework to be investigated in this study.

4.3 A THEORETICAL FRAMEWORK of eREADINESS and eCOMMERCE SUCCESS

4.3.1 Preamble

For established businesses in developing countries, migrating to eCommerce represents an innovation, which is complex and context sensitive. It is complex because as an innovation it represents technological, process, product, and administrative and social innovation. Nonetheless, this thesis agrees with the notion of the literature that considers innovation as a continuous process of improvement that transforms organizations into the eCommerce way of conducting business. One possible way of conceptualizing the continuous nature of eCommerce innovation is to look at the eCommercizing process through eCommerce maturity models (refer to chapter 3, section 3.3.3). However, our view here is that maturity cannot necessarily be viewed as a linear or irreversible evolution.

As a complex innovation, eCommerce demonstrates certain features that deserve reiterating here. First eCommerce is a *pervasive* innovation. An innovation is pervasive if, *inter alia,* it reduces the costs and improves the performance of the processes, services, and products of many sectors of an economy and entices interest as a means for increased profitability and competitive advantage (Avegarou, 1998). Second, eCommerce is *global in conduct* (Palvia et al, 2002). Third, it is *evolving* and some even argue that it is path dependent, that is its outcomes are dependent on the effects of past events (refer to Table 3.7 in Chapter 3 and Figure 2.1 in Chapter 2).

Fourth, it is *opaque*, not immediately comprehensible (understandable) by everyone, and requires not only technical but also business, marketing and global trading skills (Licker, 1997). Fifth, it is a *cluster* of minor and major innovations, involving the application of public and private knowledge bases (Corea, 2000). Sixth, eCommerce *cuts horizontally* across the organization, thus it has to be viewed in an interrelated organizational subsystem context that are to be affected in the eCommercizing process (Barrenechea, 2001; Hartman et al, 2000). Seventh, it is governed by *network externalities* (Au and Robert, 2001).

The above features of eCommerce coupled with other characteristics of eCommerce as discussed in the literature review put certain demands on the internal organization and the external environment contexts. The contexts' response to such demand affects the "*diffusion of eCommerce*".

4.3.2 Conceptualizing eReadiness

Working from an interactionsim perspective, it can be argued that, as a context sensitive complex innovation, "*eCommerce diffusion*" cannot be understood without careful attention to the organizational and environmental contexts. The organizational and environmental contexts, however, are not landmarks that remain static but rather are in a continuous state of change and interaction between each other and within the factors that define each of them. A synchronic assessment of these contexts of eCommerce gives a construct but not necessarily a picture of the reality and not necessarily a running film of the contexts. The thesis refers to this construct as the **PROFILE** of the context.

The *profile* indicates the status of the organization and the environment vis-à-vis the demands and requirements of the innovation, in this case eCommerce. Thus this thesis refers to this profile as the **eREADINESS PROFILE**. The eReadiness profile, which is the result of continuous interaction among the organizational and environmental factors and other prior innovations including eCommerce (eCommerce innovation understood as a continuous process of improvement through the maturity models), facilitates or hinders the "*diffusion of eCommerce*".

Diachronically, eReadiness can also be viewed from a *structuration* theory perspective as a continuous monitoring of organizational and environmental contexts and activities and as organizations' capacity to routinely observe and understand their eCommercizing process while they are doing it (Giddens, In Coetzee et al, 2001 and Orlikowski, 1991). This perspective brings to the forefront the notion that the very organizational and environmental resources and conditions on which organizations draw in migrating to eCommerce can at the same time be the basis for shaping and *reproducing* their internal and external environment under which they operate (Coppey et al, 1998). This view is consistent with the interactionism perspective.

The profile of eReadiness from either a synchronic or diachronic assessment is the result of an interaction of a web of internal organizational and external environmental factors. Therefore, the logical question to follow would be, what aspects of the organization and the environment are most important in constructing the eReadiness profile to promote "*eCommerce diffusion*"

in developing countries and hence to contribute to their development and to the success of the global economy, as touted in the literature?

Our emphasis on established businesses (1); the findings of the literature review (2); the preliminary discussion undertaken in section 4.2 (3); various discussions we have undertaken with experts on IT and eCommerce in developing countries (details of which are provided in the next chapter) (4); our own participation and involvement in the African Development Forum (ADF99) conference and African Knowledge Networks Forum (AKNF) preparatory and launching workshops (5); our involvement in the IDRC funded Extending the Benefits of eCommerce in Africa (EBECA) project and the preliminary studies and seminars we have conducted under the auspices of this project (6) point us towards the two constructs of eReadiness: organizational eReadiness (OeR) and environmental eReadiness (EeR).

Moreover, the above premises suggest that the organizational eReadiness profile could be constructed using four attributes of the organization. These are **Awareness**, **Commitment**, **Resources** and **Governance**. Under environmental eReadiness, we identify three issues: the readiness of the Market Forces of the organization, Supporting Industries and Government.

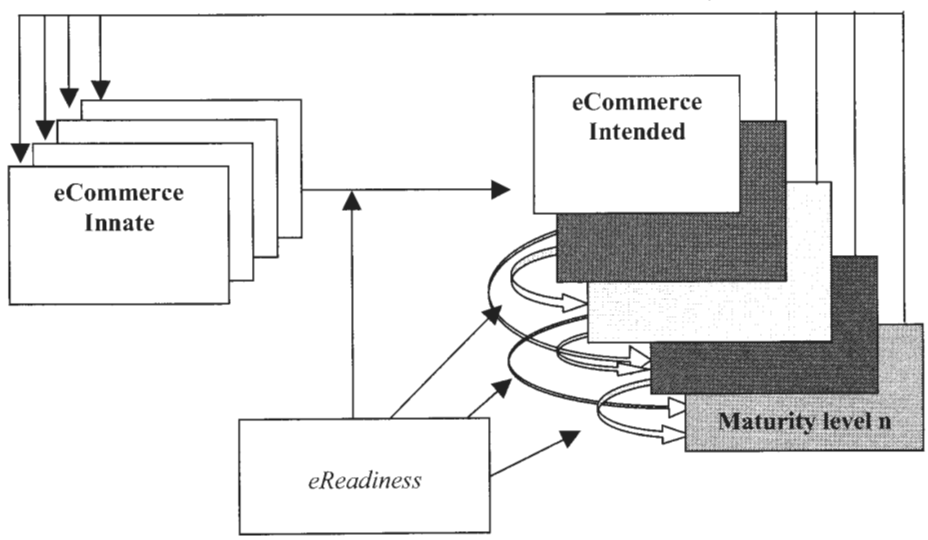
Conceptualized this way, analysis of eReadiness profile should not by any means transmit a dichotomous reality of "eReady" or "not eReady". Such a reality does not exist and the notion of "discovery" and of finding out the "truth" about the contexts is inappropriate. Rather, it should be analyzed against the milieu of where an organization wants to see itself in the eCommerce panorama (or against the intention of the context). Or in other words eReadiness should be an outcome-driven analysis. The notions of *current and desired states* (also known as *innate* and *intended*) advanced in organizational development and change literature (see Patching, 1999; Mcwhinney, 1992) are relevant to elaborate this point.

Mcwhinney (1992) defines the innate as the construct of the context that an organization starts with and intended as the construct towards which it moves either volitionally or otherwise. Thus, while the innate plays a defining role, the intended plays a directing or controlling role (Patching, 1999; Mcwhinney, 1992). Knowing the two enables organizations to understand the gaps and put in place plans to bridge that gap. However, diachronically, both innate and intended are moving targets and are not defined realities, and for that matter so is eCommerce. The current intended becomes a future innate, which leads to a future intended, which at some

time becomes an innate itself and so on. While this assumes positive growth and development, later on we will present arguments, based on "organizational decline and stagnation" that tones down this positive progression assumption.

One advantage of conceptualizing eCommerce through maturity models is that it enables to conceptualize the innate and intended states. The implication of this is that all organizations demonstrate a certain profile of eReadiness. Vis-à-vis the demands of "the eCommerce" (intended state) that the organization wants to embark on, the constructs of the eReadiness profile, which are the result of continuous interaction, might be "well developed" in some organizations and in others they might not be that developed. Moreover, while some organizations might be advanced in one or more of the attributes, they might be lacking in the others. Figure 4.5 represents a visual impression of the eReadiness conceptualization

Figure 4.5 Conceptual Model of E-readiness



For an organization, the value of assessing the eReadiness profile lies in evaluating and identifying unique opportunities, strengths, weaknesses and threats in relation to "the eCommerce" the organization intends to embark on. If organizations of every size and nature are to tap the potential presented by eCommerce with some degree of success, a "good' eReadiness profile might be an essential requirement. eReadiness might also affect the degree to which an organization leverages the eCommerce market space. Especially, organizations outside the USA and especially those involved in "hard sectors" need to develop such

capacities if they are going to successfully leverage the opportunities unveiled by eCommerce. eReadiness helps a company to define the existing business and identify what capabilities it has today and what capabilities it needs to have tomorrow. Or simply, it allows companies to question if they have what it takes to eCommercize their business.

eReadiness assessment might provide a benchmark of organizations' current positioning. It could also facilitate guidance and direction as organizations embark on the path to the electronic world. Moreover, eReadiness assessment might be used as a predictor of *"eCommerce success"*. While any organization can demonstrate a certain profile of eReadiness at any point and time, those with a higher profile of eReadiness could be expected to *"succeed in eCommerce"*. In addition, organizations are often faced with "organizational inertia" that deters their innovativeness. eReadiness assessment might enable to identify earlier the sources of such inertia and might facilitate ways of dealing with them.

The main argument of this thesis is that eReadiness, as conceptualized above, explains a significant part of the differences in *"eCommerce success"*. We will now introduce our conceptualization of eCommerce success.

4.3.3. Conceptualizing eCommerce Success

"eCommerce success" in organizations could be viewed as a dynamic process where organizational expectations, supplier's push, and environmental conditions continuously interact. We reiterate our position of treating eCommerce as a continuous process of innovation. We also submit to Straub's (1997) model of innovation diffusion as a continuous process that passes from evaluation through adoption, use to performance. The thesis, as transpired during the literature review, also subscribes to the need for assessing eCommerce success as a multidimensional construct.

Therefore, based on the above two points we propose that eCommerce success in developing countries can be modeled as a four facet construct each evaluating the execution of the four phases of innovation diffusion as recommended by Straub (1997). Likewise, we suggest four facets of **eCOMMERCE SUCCESS** covering the entire eCommerce diffusion process. These include *success of adoption (alias eCommerce adoption), success of eCommerce implementation (alias success of development), success of eCommerce use (alias success of deployment) and success of eCommerce performance (alias benefits)*. A synchronic assessment

of eCommerce success provides an equivalent profile of eCommerce success. Henceforth, throughout this text, the term eCommerce success should reflect this connotation.

Our conceptualization is comparable to the conceptualization of IS success in Ballantine et al (1998) and Saarinen (1996) and eCommerce success in Hartman et al (2000). This conceptualization enables an *ex-ante*, during and *ex-post* assessment of eCommerce success and hence captures not only the outcome aspect of eCommerce but also the entire evaluation life cycle. The model attempts to improve the understanding of the concept of eCommerce success by separating it into four facets of Adoption, Development, Deployment and Benefit (ADDB). Progression through ADDB may be influenced by a number of exogenous variables (or "filters" (Ballantine et al (1998)) such that success of adoption might not necessarily be followed by success of deployment or benefit.

4.3.4 The eReadiness and eCommerce Success Framework

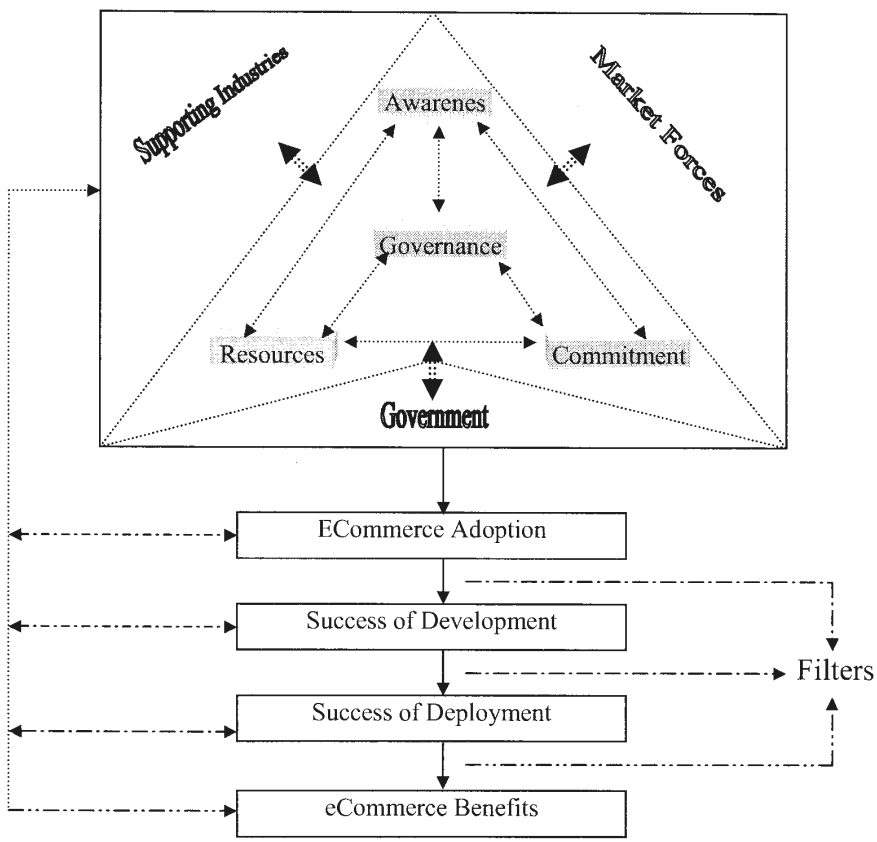
Identifying factors that inhibit or facilitate eCommerce success in developing countries is one of the research areas that is attracting the interest of a number of researchers and development agencies. However, as demonstrated in the literature review, most discussions are based on speculative arguments and lack the empirical data to support or refute the claims they are making. Others take the environment as an imperative affecting all aspects of organizational life and do not address organizational issues.

On the other hand, studies coming from the West focus mainly on organizational and technological issues and rarely address the external environment within which organizations operate or take the environment for granted. This makes the applicability of Western based studies problematic in developing countries. This thesis pursues an interactionism perspective and argues that a blend of organizational and environmental factors might be responsible in affecting eCommerce success in developing countries.

A synchronic assessment of the organizational and environmental contexts within which eCommerce is to succeed (adopted, implemented, used and produce benefits) is referred as the eReadiness profile of the context. On the other hand, the thesis conceptualizes eCommerce success on the basis of the various phases of innovation diffusion as a four-facet construct consisting of adoption, development deployment and benefits (ADDB). Further, the thesis argues that the fusion of organizational eReadiness and external eReadiness constructs provide

explanations for the significant part of the differences of the various facets of eCommerce success. These relationships are schematically illustrated in Figure 4.6

Figure 4.6 eReadiness and eCommerce Success Framework



The proposed theoretical framework makes no claim of completeness, or exhaustiveness or perfection. Rather, it is presented in the interest of having an alternative way of understanding and predicting the eCommerce phenomena in the developing world. It is an alternative way because it departs from both the environmental determinism view that dominates eCommerce discussion in developing countries and the organizational choice and innovation imperative view that is inherent in Western based models. In addition, we do also want to reiterate our position that one needs to recognize apparent differences among the so-called developing countries and we cannot claim to have developed a theoretical framework that is equally applicable to all developing countries. Nonetheless, we hope this framework, when applied in each of the developing countries' contexts would enable addressing some of the country-specific problems. Therefore, the framework should be understood as the *"stage manager's script of the* [the developing world] *stage"* (Licker, 1999).

In the following section we will discuss each of the major constructs of the theoretical framework: Organizational eReadiness, external eReadiness, and eCommerce success. In general, two types of relationships between eReadiness and eCommerce success are relevant in this study. These are (1) the relationship between the profiles of eReadiness and eCommerce success and (2) the relationship between the factors of eReadiness and eCommerce success.

4.3.5 The Organizational eReadiness Profile Construct

On the basis of the premises described in section 4.3.2, organizational eReadiness represents a profile constructed of awareness, commitment, resources and governance. We will now discuss each of these constructs. The discussion will focus on describing the constructs, their relationship with various facets of eCommerce success and on issues of operationalizing them. Because there is a paucity of literature on eCommerce in developing countries, our discussion here draws from the wider eCommerce literature.

4.3.5.1 Awareness

The literature on the process of technology diffusion unequivocally agrees that awareness about the innovation and its benefits is an important initial stage that might subsequently affect the decision to adopt or reject an innovation (Licker, 1997; Rogers, 1983). Likewise, the importance of awareness seems well recognized in the eCommerce literature. Lorraine and Greg (1996) consider developing an eCommerce image campaign and greater awareness through company wide education as a crucial process in the conduct of eCommerce.

In examining how organizations should approach the task of implementing eCommerce, Korper and Ellis (2000) also state that building an eCommerce solution should start with thinking about ways to use eCommerce and being aware of its various potentialities. They state that such high level awareness might lead to the proliferation of ideas on how to conduct eCommerce for the betterment of the organization. The same notion arose in the first African Development Forum conference (ADF 99), which, *inter alia,* debated the potential, status, impact and barriers to the growth and success of eCommerce and recommended raising eCommerce awareness at micro, macro and regional levels *"as a primary strategic component that requires immediate attention"* (UNECA, 1999; 1999b). This same view is also reflected in the UNCTAD's regional meeting on eCommerce and development (Jensen, 1999).

Several empirical studies have also confirmed the importance of awareness in affecting eCommerce success (ADDB). In the research aimed at elucidating the critical failure factors for eCommerce, Han and Noh (1999) find a lack of eCommerce awareness as one of the factors that affects the growth of eCommerce. While Han and Noh's work does not specify what aspects of eCommerce they are alluding to, based on a survey of SMEs in the APEC region, a report by PWC indicates that a lack of awareness of the potential of eCommerce is one of the main inhibiting factors affecting the use and adoption of eCommerce (APEC, 1999).

Behrendorff and Rahman (in Tan et al, 1999), however, specifically refer to eCommerce technologies and report that having little or superficial knowledge of eCommerce technologies is a crucial problem in the successful application of eCommerce. eCommerce technologies generally represent a bevy of the hardware and software applications that fall within the hard and soft infrastructure layers of our quasi-hierarchical framework introduced in Chapter 2 (Figure, 2.3). In a similar vein, NNI's (1999) survey of Australian and New Zealand based organizations reports a relationship between the level of awareness of eCommerce technologies and their implementation. Palvia and Tung (in Tan et al, 1999) after a comparative study of Internet use and issues in Singapore and USA conclude that a high level of Internet awareness is a major factor determining its use as a vehicle for communication and commerce. Lawrence's (1999) case study of the wine, vegetable and mollusc industry of Tasmania also produces similar results that most organizations exhibit a limited (electronic mail and the Internet) and somewhat "superficial" understanding of eCommerce.

While the above studies have focused on the awareness of eCommerce technologies and its impact on eCommerce success, some other studies investigated perceived eCommerce benefits as a proxy rather than awareness of the technologies *per se* (refer to Chapter 3, section 3.3.2.1 for a discussion on eCommerce benefits). Sillince et al (1998) report a lack of perceived benefits as one of the factors that differentiates e-mail adopting and non-adopting companies. PWC's survey also indicates a significant relationship between the level of perceived benefits of eCommerce and eCommerce uptake and adoption (APEC, 1999). Poon and Swatman (1999) and Lawrence (1999) also support this and state that perceived benefit is one of the critical factors for the adoption and continual use of the Internet. In a case study, Marshall et al (2000) further confirm that awareness of eCommerce benefits is the most important factor affecting eCommerce and EDI success.

Obviously eCommerce awareness is recognized as an important factor in the diffusion of eCommerce. Although discussing awareness sounds tautological, the literature does not appear to be in agreement on what constitutes eCommerce awareness. In general, two complementary themes can be identified from the way eCommerce literature considers eCommerce awareness: (1) awareness about eCommerce technologies (applications) and (2) awareness based on the perceived potential benefits of eCommerce.

In a search to have a clear understanding of what constitutes awareness, this thesis has referred to the Situational Awareness Theory (SAT), well advanced and developed in the aviation industry and military science (Endsley, 2000; Strater and Endsley, 2000; Endsley et al, 2000; Jones and Endsley, 1996). SAT defines awareness as the *perception* of the elements in the environment, the *comprehension* of their meaning and the *projection* of their status in the future (Endsley, 2000). Thus defined, awareness is a construct of perception, comprehension and projection.

According to SAT, perception represents the first level of awareness and refers to perceiving the status, attributes, and dynamics of relevant elements in the environment. Comprehension on the other hand relates to understanding the significance of those elements; and projection to the ability to project the future actions of the elements in the environment and its impact on a particular system (Endsley et al, 2000; Endsley, 2000).

Although SAT has a well-advanced body of knowledge and adequately validated measuring instruments, it has so far been applied at individual and group levels (in the aviation and military science) and not organizational level. Therefore, our reference to SAT is not to apply it in its entirety, as that will most definitely pose a validity problem. However, the framework the theory represents provides a useful window to conceptualize eCommerce awareness. As a result, we conceptualize eCommerce awareness of organizations in terms of the three stages suggested by SAT.

Organizations in developing countries need to understand both the global and local trends of eCommerce. They need to assess their environment to identify opportunities and eCommerce initiatives by their partners, competitors, government, suppliers etc. This represents the perception stage of awareness. Comprehension of eCommerce requires interpreting the trends vis-à-vis an understanding of eCommerce technologies, business models, requirements,

benefits, etc. Projection on the other hand requires realizing the future trend of eCommerce and its impact on organizations, trading partners, an industry and a country. In addition, in developing countries, due to the size of organizations and other variables (such as management style, degree of decentralization, autonomy, lack of technocrats, etc), the strategic apex is mostly the source of innovations and improvements and its awareness can play a sizeable role in the implementation of eCommerce applications. Hence, the level of eCommerce awareness of the strategic apex needs careful consideration.

4.3.5.2 Commitment

The role of top management's commitment to the successful implementation of IT and change programs has been widely recognized and documented both in the IS and organizational change studies (see for a summary Powell and Dent-Micallef 1997). Commitment has been ascribed as a chief factor discriminating successful from unsuccessful IT implementers. The commitment of managers is especially crucial to enhance IT success by making resources available for implementation and integrating IT with business strategy (Powell and Dent-Micallef 1997). The literature on IT in developing countries also supports this notion of managers' commitment as the chief factor affecting success (when present) or failure (when absent) of IT implementation (Ramasubramanian, 1999; Vreede, et al 1999; Heeks and Bhatnagar, 1999; Montealegre, 1998; Heeks, 1998a; Montealegre, 1994).

Hartman et al (2000) accentuate that in the absence of commitment, most eCommerce initiatives will be doomed to fail. Existing literature generally subscribes to this position on the role of managers' (especially CEOs') commitment in contributing to the success of eCommerce. (Barrenechea, 2001; Hartman et al, 2000; Marshall et al, 2000; Wilson,1999; Sillince et al, 1998; Goldberg and Sifonis, 1998). In fact, some ascribe CEO's commitment as the sole factor behind the story of every successful eCommerce and e-business venture (Barrenechea, 2001; Hartman et al, 2000). Hartman et al (2000) further emphasize that commitment *makes the organization as a whole from the CEO to the custodian to think and act in eCommerce terms*.

Goldberg and Sifonis (1998) associate lack of senior management's conscious decision to move to eCommerce with eCommerce sites that ended up in failure. The same notion of lack of management's commitment crippling eCommerce initiatives is advanced in Wilson (1999). This view is consistent with the understanding of many consultants and practitioners who

underscore the relevance of paying due attention to the issues of commitment before jumping to eCommerce implementation (Barrenechea, 2001; Morath, 2000). Related to this, Marshall et al (2000) indicate that treating eCommerce as a strategic business decision and not a technology decision or as a strategic and not tactical disposition and having an on-set strategy are crucial to success. Korper and Ellis, (2000); Tan and Teo's (2000); Kalakota and Robinson (1999) also support the contribution of having a clear-cut strategy championed by top management to eCommerce success. NNI (1999) however, warns that making plans and analyzing business processes without "*real, rubber-hits-the- road*" activity of allocating resources and assigning responsibilities will not result in any kind of success.

The notion of commitment as discussed above is of special importance to organizations in developing countries. In some of these countries there is a frequent turnover of managers and new recruits tend to view their predecessor's projects with some degree of skepticism (Galliers, 1998). Therefore, maintaining the momentum of commitment is very crucial to the success of eCommerce. However, it needs to be noted that, sometimes, full commitment comes only after some initial success as such initial successes could instigate interest and motivate top management to buy-in the idea and allocate the necessary resources (Wilson, 1999). By the same token, initial setbacks could frustrate managers, who in turn revert their initial commitment to the status quo, develop bias and rigidities, create inadequate or inconsistent resource deployments and develop successors who share their own repertoires (Powell and Denti-Micallef, 1997).

An organization's level of commitment to eCommerce can be manifested in a number of ways. Having a clear-cut eCommerce vision and strategy championed by top management (Korper and Ellis, 2000; Kalakota and Robinson, 1999); leadership and resource deployment (Hartman et al, 2000); organizational buy-in of eCommerce projects at all levels and enough communication with users (Kalakota and Robinson, 1999) are some of the ways through which eCommerce commitment can be demonstrated. In general, the organization's assessment that there is enough energy and support from all corners and especially from the strategic apex concerning eCommerce might affect the adoption and maturity of eCommerce.

4.3.5.3 Resources

Resources affect the capacity of an organization to respond to the challenges posed and opportunities unveiled by eCommerce. Resources possessed, developed and deployed by an

organization define the wherewithal of that organization to respond to the requirements of eCommerce. Since organizations differ in significant ways because of the stock, uniqueness, durability, specificity, heterogeneity, and inimitability of their resources, such differences could lead to variation in eCommerce success (April and Cradock, 2001). Even if this study is not pursuing competitive advantage as a main research agenda, empirical findings from resource based view (see for example, Powell and Dent-Micallef, 1997; Hall, 1993,) provide strong justification in hypothesizing relationships between the resources (related to eCommerce) of an organization and eCommerce success.

There are a variety of resource typologies. At a very generic level, resources could be classified as *tangible assets, intangible assets and organizational capabilities* (Collis and Montgomery, 1997). Following such generic classifications, Benjamin and Levinson (1993) classify resources as *organizational, business and technological* and argue that the integration of these resources influence organizational performance. Keen (1993) on the other hand divides resources into *human, business and technology* and confirms Benjamin and Levinson's argument that success depends on the capacity to fuse these three resources. In common with the above, Powell and Dent-Micallef (1997) use the same categories of resources and come up with similar conclusion that the right blend of human, business and information technology resources can predict firm performance. They also developed a measuring instrument to operationalize the three categories. The following discussion is based on the classification of resources into human, business and technological.

Human resources

The human capital of an organization is critical in developing adaptive, responsive and innovative capabilities and lack of skilled personnel (especially IT skill) is often a problem that is affecting even eCommerce-savvy organizations and nations (Roepke, 2000). Although eCommerce is founded on information technology and telecommunications, the skills needed to support an organization's eCommerce initiatives require more than technology and involve disciplines like marketing, business strategy, innovation etc (Korper and Ellis, 2000, Applegate et al, 1999, Larsen and McGuire, 1998). An organization's ability to recruit, and retain the best talents (and the markets' potential to supply what the organization needs) in those fields can significantly affect the organization's profile of eReadiness and its eCommerce success.

The skills and human resources that might affect eCommerce success can range from employees experience and exposure to basic computer technologies to having the skill base that can enable the organization to adequately staff its eCommerce projects (Hartman et al 2000, APEC 1999). A greater level of IT and Internet accessibility, and computer and on-line literacy can boost an organization's eReadiness profile and can contribute to its eCommerce readiness and success (Zhuang, 1999; Nath et al, 1998).

Business resources

What is normally referred to as business resources cover a wide range of capabilities and most of the intangible assets of the organization (see for example Powell and Dent-Micallef, 1997; Hall, 1993). The most relevant ones for this study include, but not limited to, culture, relationship, electronic experience and eCommerce-business integration.

Culture is an erstwhile concept that is subject to a plethora of understandings and interpretations and a central theme of many studies. eCommerce is often presented as requiring new forms of organizational culture characterized, *inter alia*, by a high degree of innovativeness, extreme creativity, and risk-taking (Hartman et al, 2000). While these theses are yet to be proved, the cultural readiness of the organization and the quality of organizational leadership to spawn this "precious asset" could affect its ability to succeed in eCommerce (Hartman et al, 2000; Korper and Ellis, 2000, Evans and Wurster, 2000). Maintaining over-all buy-in of eCommerce initiatives requires a culture of *open communication* and *open organization*. While *open organization* represents a culture of trusting, open relationships and minimum formalization and bureaucracy, *open communication* reflects the free flow of both oral and written communications within and across business units (Powell and Dent-Micallef, 1997).

Organizations can also vary significantly in terms of *risk aversion* (Guha et al, 1997). Some demonstrate and encourage a sense of aggressiveness and experimentation, while others tend to be cautious and want to feel their way carefully before making their move. Although the general literature (see for example, Guha, et al, 1997) is not unequivocal about the relationship between risk taking behavior (aggressive vs. cautious) and success, most in the eCommerce area advocate for embracing risk, allowing experimentation and welcoming opportunity to apply new practices (Hartman et al, 2000; Korper and Ellis, 2000; Kalakota and Robinson, 1999).

Established *business relationship* is another business resource that affects the success of eCommerce. Even if eCommerce can make possible creating and maintaining new relationships (in the sense of Zwass, 1998 and Truman, 2000) it is common that parties participating in eCommerce (especially in a business to business environment) interact on the basis of a relationship that is defined and pre-established (Senn, 2000, Applegate et al, 1999).

Buxmann and Gebauer (1999) stress that establishing and maintaining business relationship is often more challenging and critical to eCommerce success than having access to the World Wide Web or any of the eCommerce technologies. In Tapscott et al (2000), Moore describes such relationships as the ecosystem of business in the emerging e-conomy.

According to Moore (in Tapscott et al, 2000:12) an eCommerce environment is characterized by " *an economic community supported by a foundation of interacting organizations and individuals...which co-evolve their capabilities and roles and tend to align themselves with the directions set by one or more central companies".* Tapscott et al, (2000) refer to such relationships as *Digital Capital*: a capital that the organization can get because of internetworking with suppliers, distributors, and customers. Such relationships are particularly important in societies that emphasize interpersonal relationships and strong group affiliation (Jarvenpaa and Leidner, 1998). Senn (2000), Wilson (1999) and Applegate et al (1999) also share the notion of *digital capital* and its impact on eCommerce success.

An *Organization's experience* with an electronic way of doing business also shows to what extent the organization tends to embrace eCommerce. This also indicates the possible barriers an organization is going to face in implementing eCommerce applications. Organizations, which have never used any electronic means of communication (except probably the telephone), might lack the basic experience in dealing with network-based applications and practices and eCommerce might represent a big unknown and learning curve (Barrenechea, 2001). Organizational experience is very crucial particularly in developing countries because of the low level of ICT adoption in organizations and the type and nature of existing applications. Such experiences are usually indicated by assessing the way the organization is conducting its business – internally with its employees and externally with partners (Wilson, 1999; NNI, 1999).

Lack of *integration* of eCommerce with the day-to-day activities of organizations is one of the factors most researchers cite for poor results from eCommerce (Marshall et al, 2000; Truman, 2000; NNI, 1999; Poon and Swatman, 1999; Kambil and Short, 1994). Marshall et al (2000) shows that integration of eCommerce (such as Web sites) with internal systems is crucial for obtaining the expected performance advantages. This is in common with an earlier multiple-case study by Poon and Swatman (1999) where lack of integration between the other systems and eCommerce applications is claimed to have affected economic benefits from eCommerce. Truman (2000) refers to this as *interface integration* and concludes that it is favorably related to performance outcomes. Lee and Han (2000) provide additional empirical support for the above and conclude that the extent of integration explains the difference in performance among firms implementing eCommerce. Based on evidence from the previous studies, it is instructive to consider the extent of integration between eCommerce applications and the other activities of an organization as one resource (capability), which can influence eCommerce success.

In addition to the above, business resources require the most obvious resources such as adequate funding to support eCommerce initiatives and products and services that the organization can deliver to its customers. However, the product readiness part, which was once an important consideration, is increasingly losing its value as innovative eCommerce models are making it possible to sell even the impossible. Our famous case is the ethiogift model, which sells goats and sheep based on a Diaspora focused split marketing eCommerce model.

Technology resources

The degree of availability of IT resources to support eCommerce projects can pose a considerable challenge to any eCommerce initiative. While IT resource availability is one of the main tenets of eReadiness, the application of eCommerce technologies can also be considered as an end state, which in turn requires eReadiness. Or in simple terms IT (eCommerce technologies) could represent both a means and an end. In line with this, the IT resource of the organization can be looked at from two angles: those technologies that are not directly related to eCommerce and those "main-stream" eCommerce technologies.

Technologies that are not directly related to eCommerce but that affect the organization's eReadiness profile and its eCommerce success include basic computer and network applications. The extent of *computerization of the organization, and computer networks* are

among the principal technologies that enable eCommerce (Zwass, 1998). This is of course a two-way street- the other side being the negative impact of having to deal with *legacy systems*.

Although networks are widely considered to provide an organization with experience of handling network-based applications, there are cases where such resources turn out to be rigidities and prohibit organizational innovativeness (Korper and Ellis, 2000; Collis et al 1997). Therefore, the flexibility of existing systems and technologies to accommodate changes required because of eCommerce deserves due consideration (Barrenechea, 2001; NNI, 1999). Ironically, this problem is very serious in developing countries where some organizations are still operating with decades old mainframes and mini computer setups.

Connectivity and interactivity are the most crucial technological resources in eCommerce (Zhuang, 1999; Hoffman et al , 1996) . *Connectivity* refers to the interaction between the firm and its customers, suppliers, partners and internal communication. The *quality* of connectivity (such as basic, dedicated or high band width) is also an important eCommerce resource that may affect a firm's eCommerce success Zhuang (1999). According to Zhuang (1999), *interactivity* is two way real-time interactions between a firm and its customers, suppliers and partners and is more than simply being connected and represents equal and active participation. In technology-savvy organizations, the technology resource might also include having a *standard, enterprise-wide infrastructure* that is flexible, simple and well integrated to the business.

4.3.5.4 Governance

Willcocks and Griffiths (1997) refer to governance as the strategic, tactical and operational model that defines the way organizations structure themselves to establish objectives, allocate resources and make decisions. Hartman et al (2000) treat governance as the glue that holds together the way an organization is going to govern its business models and eCommerce initiatives. The governance model an organization follows defines the extent of priority given to eCommerce, the allocation of responsibilities and the extraction of accountability (Agrawal and Rao, 2000). NNI (1999) warns that all the plans and strategies that are put on paper will not make a successful eCommerce venture unless organizations clearly define and allocate ongoing responsibilities and extract accountability for executing the plans.

eCommerce implementation also requires making provision for managing and dealing with change issues (Barrenechea, 2001). The scope and complexity of such issues vary from dealing with one's own organizational inertia to navigating the inertia of partner organizations. This consideration helps the organization to chart the organizational discontinuities that may be caused by eCommerce in advance. Managers and employees readiness to change – "changeability"- to the dictates of eCommerce and ensuring that there is enough energy to sustain the expected changes from eCommerce is an important consideration (Kalakota and Robinson, 1999). The governance arrangement influences an organization's capability to manage such difficulties.

Governance also involves building a capability to integrate IS/IT effort with business purpose and activity (Heijden, 2001; Feeny and Willcocks, 1998). Hartman et al (2000) refer to this as "business smart technology and technology smart business". Hence, the smooth relationship between the IT organization and the business organization (wherever such divisions exist) is crucial to the successful implementation of eCommerce (Heijden, 2001).

A good governance model also requires organizations to develop and establish a set of metrics for benchmarking eCommerce benefits and ensuring that these metrics are acted on (Hartman et al, 2000; NNI, 1999). Such benchmarking includes defining metrics for *cost reduction, e-conomy growth, customer satisfaction and reach, operations* (Hartman et al, 2000). Overall, the governance arrangement influences the clarity of objectives, and the direction and momentum of eCommerce in an organization (Willcocks and Griffiths, 1997).

4.3.5.5 Organizational eReadiness summary

To summarize the discussion on the constructs that make the organizational eReadiness profile, this section has identified six factors: a*wareness, commitment, human resources, business resources, technology resources and governance.* In terms of the logical and structural relationship among the constructs of the eReadiness profile, it is tempting to assume a stage-based model of awareness first, and then commitment, which will be followed by governance and which in turn, facilitates resources.

However, diachronically the constructs form a mutually reinforcing relationship where the effect of one often depends on the state and status of the other. Although some interactions might be stronger and more important than others (such as the impact of commitment on the

other variables), every construct can affect every other construct such that it may not be possible for an organization to concentrate solely in one area. The attributes reinforce each other and proliferate over time in fostering the eReadiness profile and facilitating eCommerce success. This interplay and self-reinforcement is so complex as to obscure cause and effect relationships. As the mutual reinforcement proceeds, the cause and effect of individual attributes becomes blurred. Thus, advantages through the constructs are necessary for achieving and sustaining eCommerce success. Nevertheless, synchronically it is possible to investigate each one of them independently.

In addition, across time, it is tempting to assume positive progression and improvement of the organizational eReadiness profile. However, the literature on organizational decline (see for example Mueller, 2001) tones down such optimistic assumptions. In addition environmental forces could also play a role in either stagnating the organization's eReadiness profile or eroding it. This is an important consideration in developing countries where dynamic environmental forces such as change of government could influence significantly the eReadiness profile of organizations (Jarvenpaa and Leidner, 1998; Galleries et al, 1998; Kasongo, 1993).

4.3.6 The External eReadiness Profile Construct

Related to eCommerce, a lot has been said about the "conducive" and "nurturing" environments and the role national governments are expected to play in promoting eCommerce. The e-readiness studies that have proliferated over the last two to three years identify a list of environmental factors that are touted to affect eCommerce success (See Appendix 3B). A complete empirical investigation of all these variables, although useful, demands a separate study on its own accord. As a result, we have proposed three major constructs that can provide a fair assessment of the external eReadiness profile: government, market forces and supporting industries readiness.

4.3.6.1 Government eReadiness

National governments are expected to play major roles in the promotion of eCommerce. Fellenstein and Wood (2000) state that such roles should not come as a surprise and present the role the US government played in the development of eCommerce as evidence to support their argument. This same notion of governments' role in eCommerce is reflected, among others, in

McConnell and WITSA (2000; 2001); UNCTAD (2001, 1999); UNECA (1999, 1999b); APEC (1999); OECD (1998).

The OECD(1998) study identifies two positive roles of governments: *direct promotion and facilitation.* Further, it states that in countries where the private sector has already taken a lead in eCommerce, governments can support these initiatives by providing a supportive legal and regulatory environment. However, for developing countries, the study recommends that governments should be encouraged to take a creative role in promoting eCommerce and their direct intervention can act as an important catalyst for the diffusion of eCommerce applications in the private sector. The APEC study on the other hand recommends that governments of "lower GNP" APEC economies should play all the roles of *leader, educator, facilitator, promoter, regulator and financier.* McConnell and WITSA (2000) refer to this as national *E-leadership-* and caution that "*without the commitment of national governments partnered with industry to create conditions favorable for advancement, progress will be slow and uneven*".

In addition, concern for security and connectivity are some of the most widely recognized inhibitors of eCommerce success (Oxley and Yeung, 2001; Han and Noh, 1999). Both of these issues cannot be sufficiently addressed without the involvement of governments. eCommerce operates on a network that crosses borders in a world organized into nation-states. Although globalization writers predict the dismantling of nation states, current evidence is not showing any of those impacts and rather ICT in general and eCommerce in particular seems to reinforce the role of national governments (Castell, 1996). Therefore, following such wide consensus on the role of governments to the development of eCommerce (see also Molla, 2000a), it is instructive to consider government readiness to eCommerce as one of the constructs that affect eCommerce success.

Government's readiness could be manifested in a number of ways. Some of the key elements might include evidence of national eCommerce initiatives (such as the framework for global eCommerce of USA; the European initiatives on electronic commerce of EU; the Canadian eCommerce strategy; the electronic commerce master plan of Singapore, etc *)*; the extent of signed (and implemented) eCommerce-related laws and policies (this includes issues like intellectual proprietary rights; taxation, electronic signatures and authentication, etc); demonstrated government incentives to promote eCommerce (such as for example show

centers, grants, grace periods, tax exemption) (OECD, 1998; CIDHU, 2000; McConnell and WITSA, 2000, 2001).

4.3.6.2 Market forces eReadiness

The readiness of an organization's market forces (such as customers, suppliers and other partners) to conduct business electronically might affect an organization's decision to adopt eCommerce, the level of institutionalization of eCommerce and the benefits organizations might be able to draw from eCommerce. eCommerce is one aspect of the emerging digital and network economy. One of the guiding principles of most networks is that the value of the network to individual members is related to the size of the network. This is the tenet of network externalities theory (Sillince et al, 1999; Bailey et al, 1995). Based on this theory, it can be postulated that organizations whose customers and other business partners are ready to conduct business electronically (or which make such an assessment) are likely to embark on eCommerce and benefit from their implementations (Au and Kufman, 2001; NNI, 1999).

A number of factors would affect the readiness of the market forces for eCommerce. Obviously the organizational eReadiness constructs are among the chief factors affecting a business establishment's readiness to conduct business electronically. Other factors might also include availability and affordability of Internet networks, users propensity towards the Internet, availability of non-cash payment channels (Oxley and Yeung, 2001).

4.3.6.3 Supporting industries eReadiness

The conduct of eCommerce depends on a number of support-giving industries whose activities might affect the eCommerce success of organizations. The presence of supporting industries creates advantages by making available efficient, rapid and sometimes preferential access to eCommerce inputs (Porter, 1990). Although such industries might practically cover most aspects of an economy, and especially more so in developing countries, in relation to eCommerce, three such industries could be identified as critical- the availability and affordability of services from the ICT industry, the maturity and development of the financial sector to facilitate electronic transactions and the penetration and reliability of carrier and transportation facilities (fulfillment service providers) (Travica, 2002; UNECA, 1999b). Mann (2000) refers to the three as *technological infrastructure, protocols, laws and legal infrastructure* and *process infrastructure* respectively.

The availability, cost and quality of ICT networks (internet), services and equipment at the national level can materially influence the migration of business to eCommerce and eCommerce success of individual organizations (Mann, 2000; McConnell and WITSA, 2000; 2001). The IT industry is the most important of the supporting industries in affecting eCommerce. In relation to the IT industry, existence of effective and competitive hardware, software and content providers and easy and affordable access to such services could be a plus in the development of eCommerce (Molla, 2000b). The IT industry can also play a proactive role through supply push strategies, showcases and awareness building schemes to positively contribute to the diffusion of eCommerce (Molla, 2000).

In addition, the maturity of the financial sector to handle electronic transactions including the availability of services like EFT and non cash payments play a significant role in facilitating wider eCommerce uptake (Oxley and Yeung, 2001). Because of the scarcity of third generation financial institutions (non-bank organizations operating electronic cash or online accounts) the adoption of online payment systems and practices by banks of developing countries and their preparation to handle electronic transactions is critical for eCommerce success (UNCTAD, 2001). This is also facilitated by the preparation of regulatory authorities to provide the necessary supportive measures (UNCTAD, 2001; Mann 2000).

Another supporting industry that is critical to eCommerce is what is now known as *eLogistics* (UNCTAD, 2001). This is especially critical for businesses dealing in the hard sector where at the end of the day the physical product has to be delivered either to the ultimate consumer or to the industrial buyer. UNCTAD (2001) claim *eLogistics* to be a critical issue that affects most *etailers* even in the eCommerce-savvy countries.

4.3.6.4 External eReadiness summary

As there is enough literature, especially the e-readiness literature, highlighting the environmental requirements of eCommerce, we have not gone into discussing each of the above constructs in as equal detail as we have done with the organizational eReadiness profile constructs. This is in the interest of avoiding gratuitous repetitions. This study will benefit from the various e-readiness assessment tools.

The external eReadiness constructs manifest the same feature as the organizational eReadiness constructs. While synchronically they can be assessed independently of one another,

diachronically they are in a state of constant interaction and mutual co-adaptation among one another and can be influenced by organizational activities. Moreover, across time, while it is tempting to assume positive development and continuous improvement of these factors, such might not always be the case.

4.3.7 eCommerce Success

Following Straub's (1997) phases of innovation diffusion, we proposed that eCommerce success in developing countries can be modeled as a four facet construct each evaluating the execution of the four phases of innovation diffusion. Likewise, we suggested four facets of eCommerce success covering the entire eCommerce diffusion process: *adoption, development, deployment and benefit* (ADDB). The thesis argues that eReadiness, in the sense that it is conceptualized in this study explains a significant part of the differences in eCommerce success (ADDB).

4.3.7.1 eCommerce adoption

eCommerce today means many things to many people. In this study, we conceptualized eCommerce as conducting one or more of the business functions internally within the organization and externally with suppliers, intermediaries, consumers, government and other members of the extended enterprise by adopting one or more of the business models that use World Wide Web based application solutions running over Internet based networks.

Studies that investigated eCommerce adoption (such as McKay et al, 2001; Lawrence, 2001; Kendall et al, 2001; Van Akkeren and Cavaye, 1999) do not specifically identify the "eCommerce" adopted (or is likely to be adopted). However, in view of the wide variety of definitions and conceptualizations of eCommerce, we argue that it is essential that researchers clearly delineate the "eCommerce" being investigated (adopted or likely to be adopted). Otherwise, it will be difficult and confusing to make a comparison of research findings as the phenomenon (eCommerce) being adopted might be conceptualized differently among different studies.

Within the bounds of our definition of eCommerce recapped above, eCommerce adoption can take various forms and complexities. Therefore, for operational reasons it is instructive to differentiate between entry-level eCommerce adoption and the extent of such adoption. Whereas we refer to the first as *initial eCommerce adoption*, we call the second the

institutionalization of eCommerce (alias *the level of maturity of eCommerce adoption*). The first dimension shows the initial adoption of eCommerce, the second dimension however indicates the extent, complexities and use of eCommerce internally and externally to support and enable various business functions. Viewing eCommerce through the lenses of eCommerce maturity models succinctly describes our position.

Considering the current eCommerce realities of developing countries, we suggest a six-phase eCommerce status indicator. However, our emphasis here is to highlight the different statuses of the institutionalization of eCommerce and not to dictate paths through which organizations pass in their eCommercizing process. The phases (alias eCommerce status, maturity levels) are *no eCommerce, connected eCommerce, static eCommerce, interactive eCommerce, transactive eCommerce and integrated eCommerce. No eCommerce* represents businesses without access to the Internet and email. *Connected eCommerce* on the other hand refers to businesses which have access to the Internet and which use the Internet and email for business purposes (such as communication and information searching). By *static eCommerce*, we refer to having a web site to publish company information (or what is called brochureware (Hartman et al, 2001)). Such information might range from descriptions of a business and its structures for public relation purposes to keeping online product catalogues and services.

Interactive eCommerce upgrades the static eCommerce into two-way real time relationships with customers, partners, suppliers and government. *Interactive eCommerce* allows users to communicate with a company real time, and without leaving the company's site, and to enter queries, send e-mails, make orders or specifications, etc. Many researchers consider this status as the beginning of eCommerce (Mann, 2000; Treese and Stewart, 1998; Bauer and Glasson, 1999; Kalakota and Whinston, 1996), as it allows conducting, at least two of the transaction lifecycle stages electronically: searching and ordering. As a result we consider this status as an initial adoption of eCommerce. Therefore, for the purposes of this research, an organization is considered to have adopted eCommerce if it has achieved an interactive eCommerce status.

Transactive eCommerce represents online selling and purchasing of products and services including customer service. *Integrated eCommerce* on the other hand indicates an eCommerce status where the eCommerce site is linked with suppliers, customers and back office systems allowing most of the business transactions to be conducted electronically. Looking into

whether the organization has attained an interactive or transactive or integrated eCommerce status can therefore assess the level of *institutionalization of eCommerce.*

4.3.7.2 eCommerce development

For organizations that are considered to have adopted eCommerce, eCommerce adoption as operationalized above, the other facet of eCommerce success is to assess the success of the development process. Successful development of eCommerce sites might depend on the complexity of the site to be built, on the commitment of management to allocate resources and to direct the development process. It might also be influenced by the availability of either in-house or outside support in developing such systems, the experience of the organization in managing and handling network based applications and above all the governance structure the organization puts in place for managing eCommerce, (Hartman et al, 2001; Morath, 2000; Korper and Ellis, 2000; Treese and Stewart, 1999).

Measurement of the success of the development process can be made based on an external view of whether or not eCommerce projects have been completed within budget and within time (Saarinen, 1996). Although some (Symons, 1991; Symons, 1991) challenge the notion of considering as "failures" projects that are delayed and over-budgeted, most (Vreede et al, 1999; Heeks 1999; Ballantine, 1998; Willcocks and Griffiths, 1997) still consider within budget (both time and finance) completion of projects as one criterion of success.

4.3.7.3 eCommerce deployment

A successful or otherwise completed eCommerce project enters the deployment level. Deployment refers to eCommerce use by the intended users and for the intended purpose. A number of internal organizational, external environmental and site related factors could be expected to affect the level and extent of eCommerce use (Molla, 2001b; Molla and Licker, 2001). Organizational eReadiness factors such as commitment and resources affect the amount of finance to be allocated for ensuring site visibility and maintenance. External eReadiness factors such as the readiness of the market forces and their satisfaction with the eCommerce system the organization puts in place would also affect the success of deployment.

4.3.7.4 eCommerce benefit

An eCommerce system, which is successfully used, might not necessarily deliver the desired business benefits. In the literature review on the benefits of eCommerce, we have outlined

both theoretical and operational arguments on eCommerce benefits. Some of the widely touted eCommerce benefits include cost reduction, increased market reach, improvement on internal and external communication, and competitive advantage. The literature review further highlights that thus far, most of these benefits evaded businesses and most organizations are reporting below expected performance from eCommerce. We would investigate to what extent these benefits are dependent on the organizational and external eReadiness forces in chapter eight.

4.3.7.5 eCommerce success summary

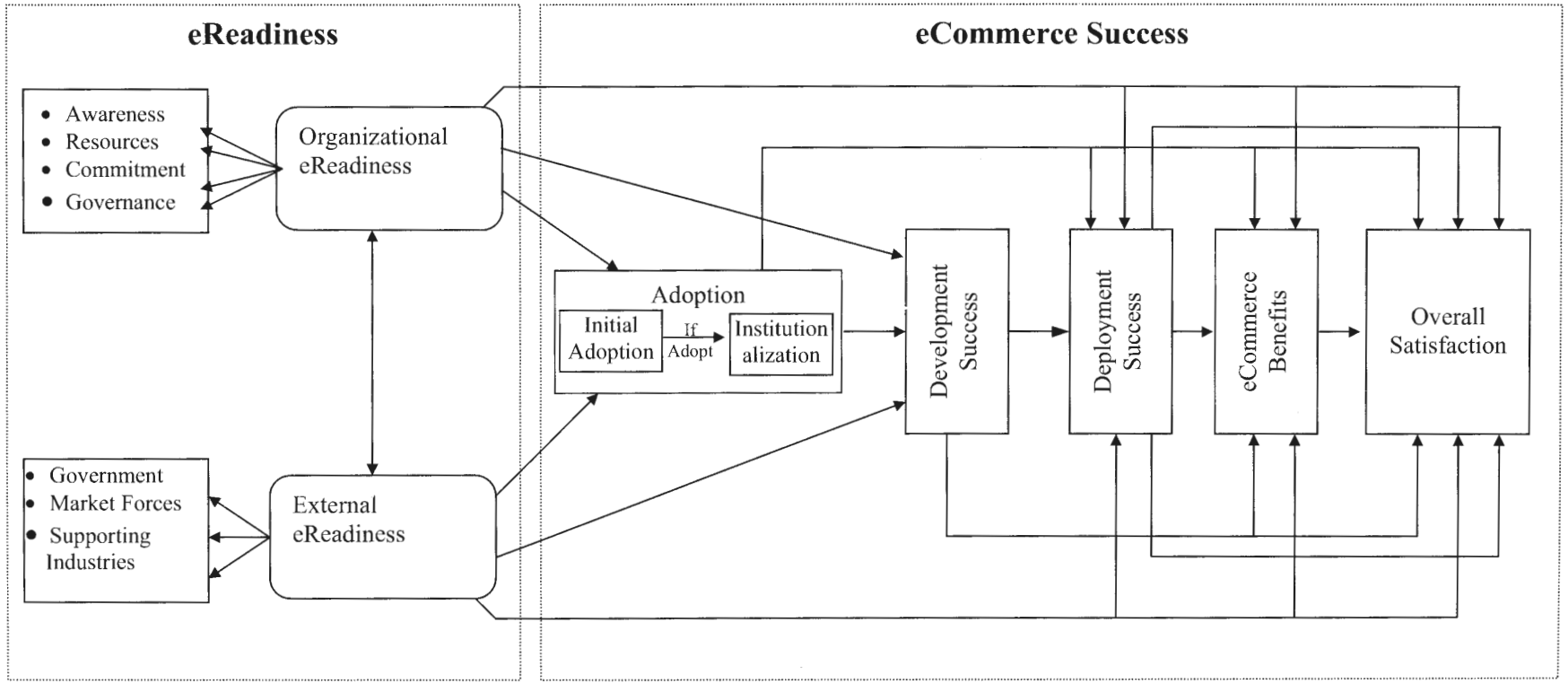
By modeling success as a four-facet construct, we hope to get a full understanding of eCommerce success and the fusion of organizational and environmental factors that affect each facet of eCommerce success. Because success has proved to be a difficult concept to operationalize, we also intend to assess success using a global level measurement such as satisfaction with the performance of eCommerce. This global measure is consistent with the suggestion of Doll and Torkzadeh (1988) and is also used by Palvia (1996).

The relationship among the different facets of eCommerce success could be an interesting area of enquiry, albeit one that deserves a separate study on its own accord and hence not to be attempted in this study. However, the relationship between the facets cannot be expected to be causal in nature, that is, success at one level does not necessarily and directly lead to success at the next level (except that adoption has to precede deployment and benefits). This is because such an assumption implies that one needs only be successful at the first stage (adoption). However, exogenous factors that work between the levels militate against such an assumption (Ballantine, 1998). Based on the discussion that has transpired hitherto, the next section introduces the research model and highlights some operational considerations.

4.4 THE RESEARCH MODEL

The previous section provides detailed discussion of the constructs of the theoretical framework. Both conceptual and operational descriptions of the constructs were provided. Based on the discussion thus far, the tentative empirical research model described in Figure 4.7 is proposed here. This section discusses the structure of the model and the issues of operationalization and proposes the preliminary research hypotheses.

Figure 4.7 An Integrated Empirical Model of eReadiness and eCommerce Success



4.4.1 Logical Structure of the Research Model

Two types of relationship between eReadiness and eCommerce success are relevant in this study. These are (1) the relationship between the level (degree) of eReadiness and eCommerce success and (2) the relationship between the factors of eReadiness and e-commerce success.

IS literature identifies two basic types of models, *process and variant* (Lee et al, 1997; Markus and Robey, 1988), on the hypothesized relationship between antecedents and outcomes. Process models posit that the antecedents and the outcomes are related in a "*recipe of sufficient conditions occurring over time*" (Robey, 1988). Variant models on the other hand assume that the antecedent variables are *necessary and sufficient* to cause the outcome conditions (Lee et al, 1997; Markus and Robey, 1988). While variant models are used to prove *causality*, process models only claim *association*. Causality assumes that the occurrence of antecedents is always followed by the occurrence of the outcome. However, process models pursue the notion that if the antecedents do not occur, then the outcome will not occur, however this cannot be extended beyond this to argue that the occurrence of the antecedents will always be followed by the occurrence of the outcome (Markus and Robey, 1988).

Both process and variant models have strengths and weaknesses (Markus and Robey, 1988). Process models are mainly criticized as not providing a convincing answer in investigating the phenomenon they are applied to. By the same token, the invariant relationship between the antecedent and outcome variables that variance models assume has been considered to be too stringent for social phenomena (Markus and Robey, 1988). In this line, in Markus and Robey (1988), Sutherland (1973) stresses that "not all real world phenomena will ultimately become deterministic if we spend enough time analyzing them".

While most (see for example in Lee et al, 1997) tend to advocate variance models, Markus and Robey (1988:592-593) offer several advantages of process-based models. Some of these advantages include that process theories enable researchers to find patterns in empirical data that variance theories might miss; that they are compatible with *emergent perspective* (which is equivalent to the interactionism perspective); that they preserve the belief in the regularity and predictability of social phenomena that characterizes the interactionism imperatives; that the predictions may correspond more faithfully to actual events in organizations than do the typical predictions of variance formulations.

This thesis conceptualized eReadiness as a construct, but not necessarily a reality, that shows a synchronic profile of the contexts (organizational and environmental) of eCommerce diffusion. As a profile, one cannot measure eCommerce on a dichotomous basis as "eReady or not eReady". eCommerce success is also conceptualized as a four-facet construct where it is argued that success at one level might not follow with success at the next level. In addition, the thesis pursues an interactionism perspective, which posits a blend of internal organizational and external environmental factors affecting eCommerce success. Moreover, eCommerce is a growing phenomenon and thus far the literature cannot claim to have sufficient knowledge to fairly predict what affects its success or failure (one needs only to reflect on the dotcom crash to substantiate this).

On top of the above, this study is probably the first one to have attempted to address eCommerce success in developing countries both from theoretical and practical vantage points. On the basis of the above premises, it may not be tenable to claim to have developed a variant model of eReadiness and eCommerce success. As a result the thesis, at this stage, works within the perspectives of process models. However, some of the relationships might tend to look and sound causal. In this respect, we would like to reiterate Mohr's (1982) argument that "*variance and process theories can "peacefully coexist" but the that the distinctions between them should not be blurred in an attempt to gain the advantage of both within a single theoretical approach*" (in Marks and Robey, 1988: 591).

A more direct implication of the above is that while eReadiness, as conceptualized here, can be hypothesized to explain a significant part the differences in eCommerce success among organizations in developing countries, it might not be taken as a complete answer.

4.4.2 Operationalization of the Research Variables

The study identifies nine conceptual variables under the two constructs of eReadiness: organizational and environmental. In addition, it also identifies four facets of eCommerce success (ADDB). The variables will be operationalized by developing a measuring instrument following standard procedures and frameworks suggested in the IS literature (such as Straub, 1989; Churchill, 1979). The instrument, after going through rigorous validation and reliability tests, will be employed to get an assessment of the items used to operationalize the organizational and environmental variables.

In general, the technique can be considered as "subjective evaluation" rather than "objective evaluation" in the sense that it will not be looking for numbers and figures (financial or otherwise) to operationalize the research variables. Rather, it will be based on getting the managers' assessment of the research variables on an agreement-disagreement scale.

Subjective evaluation has many advocates among IS and eCommerce researchers (see for example, Wang and Tang, 2001; Han and Noh, 1999; Kanellis et al, 1999; Grover et al, 1997; Saarinen, 1996; Delone and Maclean, 1992; Miller, 1989). The technique is also consistent with similar studies such as Hartman et al (2000); PricewaterhouseCoopers (2000); Wilson (1999) and most of the existing e-readiness assessment techniques. Business managers will be requested to give their assessment of their internal organization and the external environment and eCommerce success. We assume that they will be able to provide a dispassionate assessment (akin expert witness) of the items. Effort will be exerted to develop the instrument to reflect this understanding.

4.4.3 Preliminary Research Hypotheses

Based on the model, the preliminary hypotheses in table 4.3 are suggested. Detailed hypotheses have to be delayed awaiting the results of the instrument development and model and instrument validation process.

Table 4.3 Preliminary Research Hypotheses

eCommerce Success	Hypotheses
Adoption	Organizational eReadiness explains a significant part of the differences in eCommerce adoption
	External eReadiness explains a significant part of the differences in eCommerce adoption
Development	Organizational eReadiness explains a significant part of the differences in the success of eCommerce development.
	External eReadiness explains a significant part of the differences in the success of eCommerce development
Deployment	Organizational eReadiness explains a significant part of the differences in the success of eCommerce deployment
	External eReadiness explains a significant part of the differences in the success of eCommerce deployment
Benefits	Organizational eReadiness explains a significant part of the differences in eCommerce benefits
	External eReadiness explains a significant part of the differences in eCommerce benefits

4.5 SUMMARY AND CONCLUSION

This chapter introduced the main thrust of this thesis. The preliminary discussions on treating eCommerce as a complex and context sensitive innovation, the interactionism perspective and various theoretical frameworks provided the pillars upon which the theoretical framework introduced in this chapter stands.

The conceptualizations of eReadiness and eCommerce success were introduced and suffused with connotations as applied to this research. A theory of eReadiness and eCommerce success was proposed. The theory reflects the interactionism perspective and draws from a wide variety of theories including innovation diffusion, sociotechnological systems, institutional, competitiveness, resource based view and organization and management theories.

An empirical model was proposed based on the theory with two constructs of organizational and environmental eReadiness and eCommerce success. Nine variables of eReadiness and four facets of eCommerce success have been identified in the model. General hypotheses were also drawn but detailed hypotheses have to be postponed waiting the results of the instrument development and validation process.

As had been pointed out on several occasions throughout the chapter, we do not claim to have addressed the theoretical challenges of investigating eCommerce in developing countries. Nevertheless, it is possible to make a modest claim of the following four points.

First the framework addresses Robey and Zmud's (1992) call with diligence by giving due consideration to established theories. Second it departs from most of the western based models where organizational choice and embedded characteristics of innovation are considered to be the chief driving forces of innovation diffusion (adoption, development, deployment and benefit) while submitting to the ones that consider contextual factors (such as for example Orlikowski, 1993). Third, it also departs from the environmental determinism perspective that dominates most of the IT in developing countries literature while subscribing to the few that emerged challenging the environmental determinism perspective (such as Jarvenpaa and Leidner, 1998 and Montealegre, 1999b). Fourth, in doing the above three, the study hopes to have contributed to Lehman's (1996) call for IT management models for developing countries.

Nevertheless, this proposed theoretical framework makes no claim of completeness, neither exhaustiveness nor perfection. Rather, it is presented in the interest of having an alternative way of understanding and predicting the eCommerce phenomena in the developing world. Inevitably, it cannot be error-free. But we hope that it will serve as a platform for future studies in the eCommerce and developing countries line of enquiry.

In conclusion, using Licker's truism quoted at the beginning of this chapter, what the stage manager attempted thus far is to scribble the scripts of the stage. Next the stage manager moves to design the procedures that will assist to record the player's performance (Chapter 5); evaluates if the designed procedure is valid and reliable (Chapter 6), analyzes and interprets the players' performance (Chapter 7 and 8) and finally makes judgments about the script, its relationships to other scripts, its limitations and its contribution to the world of scripts, other stage managers, and players (Chapter 9). It is the hope of the stage manager that the whole process "creates excitement" and "satisfies the public".

CHAPTER FIVE

RESEARCH METHODOLOGY

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CHAPTER FIVE

RESEARCH METHODOLOGY

> *"All research philosophies... can offer an insightful perspective on the phenomena of interest in information systems research. What is required is that researchers understand the implications of their research perspective and act in ways that reflect that knowledge. ... Research methods and assumptions are not learned and appropriated in a vacuum. They are heavily influenced by the doctoral program attended [and] the agendas of powerful and respected mentors" (Orlikowski and Baroudi, 1991: 24).*

5.1 INTRODUCTION

In the previous chapter, the research model relating eReadiness and eCommerce success was discussed. The model was developed based on theoretical perspectives from organization science and information systems. It has two constructs of eReadiness: organizational (internal) and environmental (external) and four tiers of eCommerce success: success of adoption, development, deployment and benefits. Based on this model, general hypotheses were proposed.

This chapter discusses the research methodology followed to gather the data and explore the research hypotheses. The chapter covers arguments and decisions regarding epistemological choice, basic research approach, sample design, instrument development and procedures for data collection and analysis.

5.2 EPISTEMOLOGICAL CHOICE

ECommerce is an emerging multidisciplinary field. It is not yet sufficiently mature to be marked by its own unique *Weltanschauung* with metatheoretic assumptions, approaches, paradigms and adherents. The different perspectives that prevail in the field emanate mainly from the wide variety of academic and research backgrounds of the researchers and not necessarily established theories. Accordingly, a blend of research methodology and approaches from a variety of fields such as law, management science, organizational science, marketing and information systems, are brought to bear in investigating eCommerce.

Two fundamental views of enquiry could be identified in most social oriented studies- the positivist and interpretivist views (Klein and Myers, 1999; Myers 1997; Ngwenyama and Lee 1997; Walsham, 1995; Orlikowski and Baroudi, 1991; Stone, 1990). These views differ in

terms of their world view, beliefs about physical and social reality, beliefs about knowledge, beliefs about the relationship between knowledge and the empirical world, the role of the researcher, preferred mode of data analysis and so on (Orlikowski & Baroudi, 1991; Lee, 1991). Positivists maintain that systems in general and human systems in particular are largely deterministic, rational, overt and socially neutral. Interpretivists, on the other hand, take the position that systems are non-deterministic, political, covert, and social entities. Positivists mainly use hypothetico-deductivism to obtain understanding of knowledge, whereas interpretivists advocate a relativistic understanding of a phenomenon through accessing the meanings that participants assign to them. Positivists maintain that the researcher should remain objective and detached from the research subject while interpretivists argue intersubjectivity between the researcher and the observed.

Despite the existence of the two views, positivism is the dominant perspective in IS research. Recent works have, however, highlighted the deficiencies of positivism in IS and called for a more interpretive approach (Kelin and Myers, 1999; Stone, 1990). Yet, the interpretive approach is not free from limitations. Orlikowski & Baroudi, (1991) identify four basic deficiencies:

(1) The interpretive perspective does not examine external conditions that give rise to certain meanings and experiences.

(2) The perspective does not provide sufficient explanation about the unintended consequences of a researcher's actions.

(3) It does not address structural conflicts within society and organizations and ignores contradictions, which are endemic to social systems, and

(4) It fails to explain historical changes.

In addition, despite encouraging attempts (such as Klein and Myers, 1999), the interpretive approach does not appear to have sufficiently clear standards and techniques to guide researchers to conduct such a study and normally takes a longer period to execute (Ngwenyama and Lee, 1997; Stone, 1990). Moreover, there are a plethora of schools of thought that fall within the interpretive paradigm. This has an impact on how to conduct interpretive research and its relation to the research conducted in the positivist mode. The above problems associated with the interpretive approach are believed to contaminate the results of an interpretive study through the values and beliefs of researchers (Klein and Myers, 1999; Myers, 1997; Stone, 1990).

Because of the basic limitations of the two extreme views, some advocate a plurality of views (a middle ground) that involve elements from each research paradigm and hence complement their limitations (Kanellis et al, 1999). However, this tends to be more of a methodologically correct, (akin to politically correct) statement rather than a practical solution. The so-called middle ground is always hard to clearly define and hence remains at the discretion of researchers. Proponents of a strong interpretive approach reflect this view and maintain that there is no sense in which an interpretive perspective can accommodate a positivistic belief (Walsham, 1995; Orlikowski and Baroudi, 1991).

The epistemological choice between positivism and interpretivism should not therefore be based on which approach is superior. Wright (1995) argues that the perennial debate about the merits and demerits of quantitative versus qualitative research with the assumption that one is superior over the other is not particularly helpful. She goes on to say that one approach is not *a priori* better than the other and both have merits and weaknesses. Lee (1997) supports this view and proposes that there is no need to dispute over such issues. What is required therefore is as indicated in the quote at the beginning of the chapter, for "researchers to understand the implications of their researching perspective and act in ways that reflect that knowledge" (Orlikowski and Baroudi, 1991).

In general, a researcher's epistemological choice is normally based on the nature and freshness of the subject matter, the phenomenon of interest, the purpose of the research, the research questions, the time and other practical research constraints and more importantly his/her own training (Ali, 1998; Orlikowski and Baroudi, 1991).

The main purpose of the research reported in this thesis is to assess the nature of the relationship between the concepts of eReadiness and eCommerce success. This requires the research to start with abstract conceptualization and the development of a conceptual and theoretical structure prior to testing. Further, the research works with formal propositions, quantifiable measures of variables, hypothesis testing and the drawing of inferences about eReadiness and eCommerce success. Hence, the research falls within the paradigm of positivism. However, despite the existence of an *a priori* theory and operational variables that are to be probed within the research setup, it is necessary to consider the broader national context in drawing conclusions and interpreting the results of the study. Therefore, it is

instructive to provide a rich description of the context within which the research is conducted. Such uses of multiple data sources and analyses allow for a balance between generalizability and statistical rigor on the one hand and the richness of drawing context sensitive conclusions on the other (Harrigan, 1983). Although, by doing that, the research does not claim to take the middle ground between the two epistemological positions, it hopes to bring more validity, reliability and relevance to the outcomes of the study.

5.3 BASIC METHODOLOGY

Methodological issues have to be answered within the context of a particular research setting and a method *per se* is neither appropriate nor inappropriate until it is applied to a specific problem (Downey and Ireland, 1983). In this connection, some methodologies tend to be highly suitable for a positivist approach while others do not lend themselves to positivism. Hence, the epistemological choice might dictate the method to be applied. This study has adopted a survey research approach as the basic research method to guide the investigation of the research questions because of (1) the nature of the study and its objectives, (2) the suitability of survey research for probing relationships among research variables and (3) its consistency with the well-established tradition in the IS empirical study (see for example Farhammud and Drury, 1999; Pinsonneault and Kraemer, 1993; Orlikowski and Baroudi, 1991; Kraemer, 1991).

The research reported in this thesis draws from a variety of theoretical frameworks in order to develop hypotheses and interpret results. Survey research is particularly helpful in such theoretically eclectic situations where the research aims to verify relationships and test hypotheses (Pinsonneault and Kraemer, 1993; Kraemer, 1991). Especially, when the research aims to identify the existence of perceived problems and their pervasiveness, survey research easily indicates such issues. In addition, the problem and the theorization process involved in this thesis require a deductive research approach. Survey research is an ideal choice and has a valid place in a hypothetico-deductive research context (Lee, 1997; Gill and Johnson,1991).

Backstrom and Hursh-Cesar (1981) summarize the characteristics of survey research as *systematic, unbiased, representative, theoretical, quantitative, self-monitoring, and contemporary (focus on current rather than on historical factual findings).* Nevertheless, such characteristics of survey research are not shared by all surveys and there are strong criticisms of survey research in IS. However, more often than not, the problem is the misapplication of

survey research and surveys in themselves are neither good nor bad (Lee, 1997; Wright, 1995). Properly used, surveys can accurately document the norm, identify extreme outcomes and delineate associations between variables in a sample (Kraemer, 1991). In fact, despite strong criticism of survey research, meta-research findings (such as Kraemer, 1991) indicate that survey research has a more theoretically varied and constructive role in the investigation of organizations (Kraemer, 1991). Therefore, an important consideration in conducting survey research is to properly design the survey so that possible errors can be avoided. There are four potential sources of errors one needs to be wary of in a survey research: (1) measurement error, (2) sampling error, (3) internal validity error and (4) statistical conclusion error (Boudreau et al, 2001; Grover, 1997; Straub 1989).

Measurement error occurs because of the use of an insufficiently validated and less reliable instruments. Sampling error on the other hand is related to the procedures adopted in choosing the sample frame, sample selection, sample size and response rates. Internal validity and statistical conclusion errors address questions of whether differences in the dependent variable are indeed caused by the independent variable and errors related to the statistical power of the tests used respectively. Minimizing the above errors requires careful survey design, which involves instrument design, sample design, data collection design and analysis design. The following sections discuss the steps undertaken in designing the survey and in controlling the errors identified above.

5.4 INSTRUMENT DESIGN

One of the most significant errors in survey research is the measurement error. The instrument design procedure should demonstrate the accuracy and validity of the research instrument. One way of controlling such measurement error and ensuring accuracy and validity is using instruments that are sufficiently validated and applied in similar research. For this purpose, before designing the instrument used for the research, existing instruments were searched. While there are a number of instruments for assessing eReadiness (Appendix 3A), none of them have been found to be appropriate for the purposes of this research. Despite the variation in the contents of existing measures, most of them are designed to assess the eReadiness of a given economy or community or region. However, the primary unit of analysis in this research is the organization. On the other hand, instruments that assess organizational level eReadiness (such as those found in Hartman et al, 2000; Wilson, 1999) could not be used for our research because they were designed to be used in the developed West and have inherent assumptions

about the context and the level and sophistication of eCommerce activities *par* Cisco, Oracle and Amazon. These assumptions do not necessarily hold in developing countries. The existing instruments have however informed the instrument design process.

In order to ensure accuracy and validity of the instrument and to reduce the measurement error, existing frameworks and procedures (such as Boudreau et al, 2001; Grover, 1997; Straub, 1989; Churchill, 1979) of instrument development were followed. In general, based on Churchill's (1979) framework the instrument development process involved the following stages (see also Figure 5.1).

5.4.1 Stage 1: Specify Domain of Construct

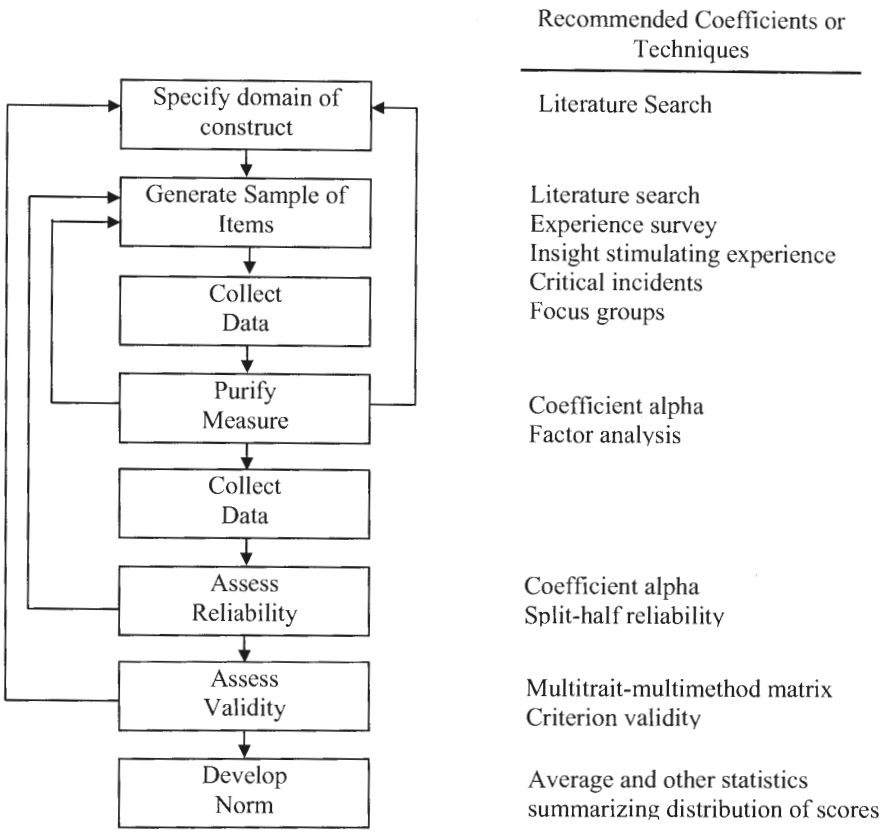
Defining a construct's theoretical meaning and conceptual domain are necessary steps in developing an accurate and valid instrument (Churchill, 1979). Clear domain definition is also an essential procedure in ensuring the content validity of an instrument. Through an extensive literature search, definitions of the main constructs of the study namely organizational eReadiness, environmental eReadiness and eCommerce success were made. In addition, exploratory interviews and informal discussions were conducted with three academicians and three consultants who have relevant experience in eCommerce issues in developing countries. Two of the consultants were extensively involved in launching eCommerce ventures throughout Africa and advising the UN Economic Commission for Africa on eCommerce issues. The main purpose of the discussions was to get the views of the experts on the main constructs of the study that were identified through the theoretical base and to have initial ideas on the items to be included to in the domain of the constructs. The author also benefited from comments and discussions at the BITWorld 2001 doctoral consortium. Overall, the various discussions provided helpful insights in refining the definitions of the constructs' domain. From this effort, a finer-grained definition of the major constructs and an initial pool of items were obtained. This formed the basis for developing the instrument.

5.4.2 Stage 2: Generate Sample of Items

The purpose of this step is to take the information gathered in the initial exploration of the constructs and develop a pool of items. Pooling a representative collection of items contributes towards ensuring content validity (Nunnally, 1970). Through an extensive search of the existing eReadiness literature and using the insight obtained from the initial exploration, an initial pool of items (in total 155) for each of the major research constructs was generated (Appendix 5D). Once the items were collected, two rounds of discussions were conducted with

the research supervisor about the relevance of each of the items in relation to the constructs they operationalize. The items were further edited to capture the essence of the constructs of the study and to ensure that the wording would be as precise as possible. This resulted in a preliminary instrument (Appendix 5C).

Figure 5.1 A Procedure for Developing Better Measures



(Source: Churchill, 1979: 66)

5.4.3 Stage 3: Pre-testing

The primary objective in this stage was to further strengthen the content validity of the instrument. A content valid instrument is difficult to create and perhaps even more difficult to verify because of the infinity of the universe of possible content. Cronbach (1971) suggests a review process whereby experts in the field familiar with the content of the universe of the research evaluate versions of the instrument until a form of consensus is reached. Following the development of the preliminary instrument (Appendix 5C), a panel of 20 experts including the six involved in the discussion of the domain of construct was contacted. The panelists were selected on the basis of their experience (either practical or research) and knowledge of

eCommerce issues in developing countries and represent both academicians and practitioners. The experts have the following designations:

- Three of the experts were involved in the Pan African eCommerce initiative and eCommerce baseline study.
- Another 3 of the experts were extensively involved in various capacities in the preparation of the South African eCommerce discussion, green and white papers.
- Two experts belong to a local NGO working towards bridging the digital divide and have produced a comprehensive comparison of existing eReadiness assessment tools.
- Two experts came from an eCommerce Consulting firm in South Africa.
- The rest of the experts were academicians, with relevant research experience in eCommerce and include four professors, three associate professors, one assistant professor and two lecturers.

The experts were asked to judge the degree of relevance of each of the items in the instrument (Appendix 5C) as possible measures of the research constructs on a five-point Likert-type scale ranging from extremely relevant (5) to not at all relevant (1). They were also encouraged to suggest additional items they believe are not covered in the instrument.

Responses were obtained from 16 members of the panel. Before analyzing the data obtained through this process, the inter-observer reliability was evaluated. Inter-observer reliability provides a measure of how well two or more evaluators agree in their assessment of a variable. It is usually reported as a correlation coefficient (inter-rater correlation) between different judges (Litwin, 1995). It can also be analyzed by comparing the correlation coefficient of the individual rater to the total score, excluding the rater's score, (corrected rater-total correlation). If the correlation coefficients are significantly high, they indicate strong agreement between the different judges implying reliability and stability of observers' ratings (Litwin, 1995). At p= 0.01, all of the inter-rater and corrected rater-total correlations are significantly high (Appendix 5F) supporting the stability and reliability of the experts' judgment.

To discern the relevant items based on the experts' judgment, the mean relevance score (MRS) was computed (Appendix 5G) for each of the items in the preliminary instrument (Appendix 5C). A total of 19 items (A1, A4, A9, A11, A13, A12, C1, C4, R1, R2, R9, R18, R19, R20, R21, R22, R29, MFeR1 and GveR1- refer to appendix 5C for description of the items) whose

MRS was less than average, that is 2.5, were excluded from the instrument (Appendix 5G). The panel of experts also suggested additional items for some of the constructs and modifications in the wordings of some of the items. After careful examination of the suggestions, nine of the additional items suggested (A1, A8, A10, SBN11, SBN12, SBN13, SBN14, SBN15, SGLOBAL in Appendix 5B) were introduced into the instrument and the statements were further edited to make their wordings as precise as possible. In addition, for each of the major constructs of the research, control variables are defined (A11, R5, R16, R24, C9, G11, EGlobal, SGlobal in Appendix 5B). These variables can be used to obtain a quick assessment of the research variables prior to detailed analysis and are useful in analyzing the predictive validity of the research instrument.

The procedures adopted to define the domain of the construct, pool a significantly large number of items and test their relevancy using a panel of experts in the field have helped the researcher to sample a representative collection of items from the universal pool. We believe that the item list constituted a sufficient coverage of the domain of the research constructs and the procedures can be considered as adequate to satisfy the test for content validity. The instrument was then pilot tested using a sample of business organizations.

5.4.4 Stage 4: Pilot Study

The purposes of the pilot study were to establish the basic soundness of the model before scale purification and to eliminate duplicative items, that is, items with aspects sharing the same underlying concept. Meanwhile, the pilot study was also intended to check for poor questions and poor answer choices including inappropriate questions and answers, two- in- one questions, vague words and instruction clarity.

The respondents for the pilot study were selected from the Top 300 South African Companies business directory. The directory profiles the 300 companies from all sectors and across sizes and was considered as an appropriate sampling framework for the purposes of the pilot study. The instrument used in the pilot study was developed using a five-point Likert-type scale ranging from strongly agree (1) to strongly disagree (5) (Appendix 5B). To reduce the caveats related to the inequality of intervals and the differences in people's evaluations of the intervals, only the two extreme intervals were anchored (De Vaus, 1995; Fowler, 1993; Kraemer, 1991). This technique makes the increments in the scale to be regarded as equal. In addition, it makes

the scale more like an interval scale and provides justification for use of parametric statistical analyses in analyzing the data (Saarinen, 1996).

In addition to the items operationalizing the main constructs of the study, the instrument used for the pilot study contains respondent demography and business profile questions. In general the instrument was pilot tested in a survey of 60 randomly selected business organizations. To increase the generalizability of the results, the respondents were spread across organizations at different stages of eCommerce maturity and implementation. After three weeks and telephone follow up efforts, a total of 12 responses were obtained. The response was adequate for the purposes of the pilot study (see for example Wang and Tang, 2001; and Palvia, 1996). In addition, telephone discussions were held with four of the respondents to establish instruction clarity and any difficulties the respondents experienced in completing the questionnaire.

The main purpose of the pilot study, as discussed earlier, was to establish the basic soundness of the instrument before full study. Another purpose was to eliminate "logically duplicative" items, that is, items with aspects sharing the same underlying concept (Palvia, 1996). Correlation coefficients were examined for all pairs of the items within the main research constructs (excluding items used to capture demographic, business profile, eCommerce capabilities and business functions). In each pair where the correlation coefficient was significant at p=0.001, one item within the pair was considered for elimination to enhance instrument readability and parsimony (Palvia, 1996). Because related items are not necessarily duplicates, not all related items have to be eliminated and only duplicated items need to be removed. The low level of significance was therefore chosen for stringency in elimination, as the intention was to look for duplicates and not just related items (Wang and Tang, 2001; Palvia, 1996).

In all cases, before deleting any item, the impact of such deletion on the domain coverage (that is content validity of the construct) was evaluated in order to ensure that the domain coverage would not suffer as the result of this exercise. In addition, the measure's corrected-item-total correlation was investigated to assess the improvement on the reliability of the measure as a result of dropping a particular item. Where an item was deleted, the item in the pair with the lowest corrected item-to-total correlation was dropped (Wang and Tang, 2001; Palvia, 1996). After this exercise, a total of six items (A6, C6, R18, GVeR1, SAD1, SBN11 in Appendix 5B)

were dropped from the instrument leaving a total number of 85 (including 8 control variables) items. Table 5.1 summarizes the results of the pilot study.

Table 5.1 Summary of the Pilot Study

Category	Significantly correlated items	R	Items to be deleted	Reason for not deleting significantly correlated items	Cronbach Alpha
Organizational eReadiness	A6, A3	0.90	A6	• A11 and A4 are not duplicates (A11 is a control variable) • Items that measure resource R and those that assess awareness (A) couldn't be considered as duplicates • No improvement in reliability if either R7 or R12 are dropped, also domain coverage will suffer if either is dropped • C5 and A7 represent different components • C9 is a control variable	0.91
	A6, A4	0.93			
	A6, A5	0.91			
	A6,A9	0.88			
	A11,A4	0.87			
	R4, A3	0.89			
	R5, A4	0.94			
	R5,A5	0.88			
	R5, A6	0.91			
	R9, A3	0.93			
	R9,A4	0.87			
	R9,A6	0.87			
	R10,A4	0.89			
	R10,A11	0.91			
	R12, R7	0.87	R18		
	R18, R14	0.88			
	R18, R17	0.93			
	C5, A7	0.97			
	C6, C7	0.98	C6		
	C6, C9	0.96			
	C7, C9	0.95			
	C9, C1	0.95			
External eReadiness	GVeR1,GVeR2	0.95	GVeR1		0.70
ECommerce Success	SAD1, SAD2	0.93	SAD1	• Removing either SBN8 or 9 reduce reliability	0.89
	SBN2, SBN11	0.94			
	SBN8, SBN9	0.95	SBN11		

At the end of the pilot study, the instrument and the items are considered as adequate for the main study. That is, the instrument has face validity; it has a preliminary reliability within an acceptable range; it passes the test for parsimony and readability and questions and instructions are reported to be clear. Table 5.2 summarizes the instrument development process so far. Appendix 5E summarizes the items dropped and introduced in the course of the above four stages of the instrument development process and it can also be used to track the item identification changes among the four versions of the instrument. To test the validity and reliability of the instrument, additional data has to be collected. The next section highlights the

sample design used to conduct the full study and chapter 6 will provide further discussions on the validity and reliability of the research instrument and model following the data collection.

Table 5.2 Summary of Instrument Development

	Major Research Constructs						eCommerce maturity	eCommerce capabilities	Business functions	Total for research construct
	Awareness	Commitment	Resources	Governance	External Environment	Success				
Initial Pool of Items	26	14	48	12	30	25	4	20	17	155
2 rounds of Discussion with Supervisor										
Add	3	4	2	4	4	1	2	2		18
Remove	15	7	17	5	19	10		2	2	73
Net to next stage	14	11	33	11	15	16	6	20	15	100
Panel of Experts										
Add	3					6				9
Remove	6	2	9		2					19
Net to next stage	11	9	24	11	13	22				90
Pilot testin g										0
Add									1	0
Remove	1	1	1		1	2		1		6
Net to next stage										
No. of items in the final instrument										
N0. Of candidate items	32	18	50	16	34	32	6	22	18	182
No of Rejected Items	22	10	27	5	22	12	0	3	2	98
Total No. of items	10	8	23	11	12	20	6	19	16	84

5.5 SAMPLE DESIGN

The sample design involves the three key aspects of sampling frame, sample selection criteria and sample size (Fowler, 1993). These three areas are interrelated in such a way that a decision in one affects or conditions the decisions in the others.

5.5.1 Sampling Frame

Although there are various lists of business organizations, it was impossible to find a usable list, as often is the case in most IS research (Kraemer, 1991) that contains all the organizations across sectors and sizes in a given country. In developing countries, in particular, such a list is hard to produce and obtain. Therefore, the first stage of the sampling process was to identify a list that can be representative of the theoretical universe and then to draw a truly random sample from such a list. The author developed a set of operational criteria to locate the sampling frame. These include: the characteristics of the population to be studied, the comprehensiveness of the list to represent the population of interest, the completeness of the list in terms of contact addresses and the required sample size.

Some of the considerations in relation to defining the population included whether or not the survey should be confined to organizations that currently conduct eCommerce and whether or not there should be sector, size or geographical delimitations. The research was not intended to

identify the effects of ecological variables such as organization size and industrial type on the eReadiness of the organization and its success. Neither was the research aimed to investigate the impact of such dimensions on the outcome of the research. Hence, it was not desirable to develop a theoretical sample limited by the above ecological factors but rather draw a sample inclusive of all walks of organizations and explore potential relationships among the research constructs.

Because of the newness of eCommerce and the ambiguity of what constitutes eCommerce and because the research was seeking to investigate eCommerce adoption as one research variable, it was not also necessary to restrict the population to those that currently conduct eCommerce. Rather, to sufficiently address the research questions, it was essential to include zero values, that is, organizations that are not conducting any eCommerce, eCommerce as defined for the purposes of this study. Such data was essential to probe whether eReadiness has any impact on the organizations' success of eCommerce adoption.

In relation to sector and size delimitation, plurality of data sources was the primary consideration. Plurality can be attained when the data subjects represent a wide variety of interests rather than say for example a single sector. As a result, it was not essential to delimit the target population to a specific sector and/or size. In so doing, it is intended to obtain data from business organizations that represent a number of sectors and a cross section of sizes. As to the geographical coverage, the economics of data collection and the availability of a usable sampling frame exerted influence such that the data for this study are collected from South Africa.

Based on the above considerations a reputable business directory that has been in publication for more than 60 years and that satisfy the above selection criteria was identified as a frame from which the sample was drawn.

5.5.2 Sample Selection Criteria

Once the sampling frame was defined to get to the appropriate theoretical population, the next decision was to determine how to select the sample. The major concern in this process was ensuring the randomness of the sample selection process as any sampling that excludes random selection is laden with a number of problems. The sampling technique used in the study was *systematic sampling*. Systematic sampling overcomes the difficulties and tedious work

involved in simple random sampling while at the same time not biasing the sample selection. Akin to simple random sampling, systematic sampling gives each element in the population an equal probability of being selected for the sample.

5.5.3 Sample size

In relation to the sample size, it is important to differentiate the minimum required returned sample size (MRSS) and the actual sample size of organizations contacted (Bartlett et al, 2001; Salkind, 1997; De Vaus, 1995; Fink, 1995). This is important because while there are suggested formulae and criteria that can be used to determine the first, the latter is normally adjusted for non-response rate; is often a compromise among a number of factors and is usually larger than the MRSS.

A number of factors were considered in determining the MRSS. Some of these include the population size, desired accuracy and precision and types of data analyses. For example, in terms of population size, while some (Bartlett et al, 2001) argue about the relevance of the population size in sample size determination, others (De Vaus, 1995; Fowler, 1993) discount the importance of the population size in sample size determination. The latter further argue that the size of the population from which a sample of a particular size is drawn has virtually no impact on how well that sample is likely to describe the population. As a result, the argument continues, *a sample of 150 people can describe a population of 15000 or 15 million with virtually the same degree of accuracy* (Fowler, 1993).

Some also argue that the MRSS has to be determined by taking the two key factors of accuracy and the extent to which there is variation in the population (Bartlett et al, 2001; De Vaus, 1995). Subsequently a number of tools are suggested for determining the MRSS based on the desired degree of accuracy and expected confidence level (Bartlett et al, 2001; De Vaus, 1995). However, others (Fowler, 1993) consider such approaches as erroneous by noting that (1) it is unusual for the researcher to base a sample size decision on the need for precision of a single estimate as most studies are designed to make numerous estimates and (2) it is also unusual for a researcher to be able to specify a desired level of precision *a priori*.

In terms of data analysis requirements, it has been suggested that if for example a researcher wishes to use multiple regression analysis, the ratio of observations to independent variables

should not fall below five while factor analysis should not be done with less than 100 observations (Bartlett et al, 2001).

In general, most agree that there is seldom a definitive answer about how large a sample should be specified in advance for any given study. As often is the case, in the final instance, the decision on the sample size is a matter of judgment rather than of calculation (De Vaus, 1995; Fowler, 1993; Schnetler et al, 1989). The 2000 survey from Statistics South Africa, which is the latest available at the time of conducting this study, estimates about 80850 private businesses in the small (63600), medium (11560) and large (5690) categories. Therefore, by taking into account the above considerations it was decided that a minimum returned sample size of 150-200 would be ideal for this study. This figure has taken into account the number of possible independent variables and the statistical tests envisaged to analyze the data.

One of the challenges of undertaking a survey research, however, is the obvious non-responsiveness. Despite applying all the textbook techniques to boost response rate, one has always to face the chilling effects of lower response rates with the potential effects of non-response bias. This is a common phenomenon in information systems research (Pinsonneault and Kraemer, 1993) and much more compounded when doing research in developing countries (Dixon and Leach, 1984). Non-response bias, if present, contaminates the whole research (Bartlett et al, 2001; Fowler, 1993)

Some (Bartlett et al, 2001; Salkind, 1997; De Vaus, 1995; Fink, 1995) recommend drawing a larger initial sample size (ISS) as a way of dealing with non-responsiveness. Bartlett et al (2001) suggest four methods to determine the anticipated response rate in a situation where over sampling is required: (1) taking the sample in two steps and using the results of the first step to estimate how many additional responses may be expected from the second step (2) use pilot study results (3) use response rates from previous studies of the same or similar population or (4) estimate the response rate. They further argue that the first three ways are logical and will produce valid estimates of response rates.

Based on Bartlett et al's suggestions, this study used the result of the pilot study, which attained a 20% response rate to determine the anticipated response rate and the ISS. As a result, in order to obtain a MRSS of 150 to 200, it was required that the ISS should be five times larger than the MRSS. In general, the final sample size, which was a compromise among

the above considerations and cost, accuracy, and ensuring sufficient numbers for meaningful analyses, was 1000.

5.6. DATA COLLECTION PROCEDURE

The data was collected using a self-administered questionnaire (Appendix 5A), which was developed following the steps described in section 5.4 of this chapter. The unit of analysis in the study is the organization and respondents that truly represent this unit of analysis had to be selected. This was essential because, the responses sought to address the research questions required an agent who could holistically speak on behalf of an organization. Therefore, the questionnaire was addressed to the managing directors of each of the organizations in the sample. A covering letter explaining the purposes of the research; assuring anonymity of both respondents and their organization and providing instructions on who was supposed to complete the questionnaire was sent to the managing director of each of the organizations together with the questionnaire and a postage-paid, self-addressed return envelope through post.

The postal method was desired over e-mail and Web form to avoid pre-innovative bias as using such channels assumes that potential respondents have access to these technologies. The initial wave was followed by using two strategies- phone calls and when available e-mail. Three rounds of e-mail reminders and a total of 425 phone calls were made. After 90 days, a total of 147 responses were obtained. Although this figure was close to the desired MRSS, it was essential to determine if there is a non-response bias element in the study.

The major problem associated with non-response is the risk that non-respondents might differ from respondents in terms of their responses or generally the control of non-response bias. It has been suggested that administering a second wave and comparing those that responded immediately with those that responded as a result of the second wave can be used to investigate non-response bias (De Vaus, 1995; Fowler, 1993; Kraemer, 1991). While some suggest administering the second wave to all non-respondents, because of budget, time and other constraints that is rarely the case and one has to settle for less. An option therefore is to draw a random sample of non-respondents and to administer the second wave for them (Bartlett et al, 2001; Fowler, 1993). Donald (1967), Hagbert (1968), Johnson (1959) and Miller and Smith (1983) (all in Bartlett, 2001) recommend that in such a situation, the researcher

should take a random sample of 10-20% of the non-respondents to use in non-respondent follow-up analysis.

A total of 150 companies were randomly selected from the non-respondents for administering the second round survey. Because anonymity was ensured in the survey, we developed the following working procedure to identify the non-respondents:

- First, the refusals and unreachables were dropped from the database.
- Of the 147 respondents in the first wave, 78% of them have expressed interest in receiving the results of the study and have provided their address. This data was used to further discern the non-respondents.
- From the remaining list, 150 companies were randomly selected and through a telephone call, attempts were made to ensure that they are the right candidates for the second wave, that is, non-respondents.

The questionnaire, together with a covering letter and a self-addressed, postage-paid return-envelope was sent to those selected through the above process. After five days all the 150 companies were contacted through telephone to encourage response. After 30 days, a total of 22 responses were obtained. In general, the two rounds of survey were conducted over a period of 120 days and resulted in 169 total responses, out of which 19 were found to be incomplete resulting in 150 usable responses.

5.7 DATA CAPTURING AND ANALYSIS PROCEDURE

Each response was given a unique sequential identification number on arrival. An Excel worksheet using the item identifications defined in Appendix 5A was prepared to capture the data and the data was entered into the worksheet on a first-come basis. This was essential as it allows for analyzing the data for non-response bias.

The captured data was then imported to the Statistica Software. While descriptive and graphical analyses of the data were performed using Microsoft Excel, the Statistica software was used for the various statistical analyses. The statistical analysis techniques used fall within the Multivariate Data Analysis family (MA). The purpose of multivariate analysis is to measure, explain and/or predict the degree of relationship among variates. MA also allows simultaneous analysis of multiple measurements and investigations of the effect of interrelated

variables (Hair et al, 1995; 1979). Therefore, MA suits the purpose of this study, which is developing a model and exploring potential relationships among the various constructs of the model. In addition to descriptive statistical analysis such as mean and correlation analysis, ANOVA/MANOVA, canonical analysis, cluster analysis, discriminant analysis, factor analysis and Item/reliability analysis were used to analyze the collected data. In all cases, the missing data was eliminated from the list and a five percent ($p = 0.05$) significant level was maintained for most of the analyses unless indicated otherwise.

5.8. SUMMARY

This chapter discussed the methodology design adopted to undertake the study. On each of the methodological issues, that is, epistemological choice, research method, instrumentation, sample design and data collection, contending arguments were presented and sufficient justification was provided for the positions taken and choices made.

The research falls within the positivist school of enquiry and a survey approach was considered as an appropriate method to investigate the research questions. Stringent procedures were followed to develop the instrument, design the sample, collect the data, boost response rate and test for non-response bias. These procedures helped to minimize the possible sources of measurement and sampling errors and contributed to the quality of the study. The number of responses obtained is within the range of the desired minimum returned sample size and allows meaningful statistical analyses.

In the subsequent chapters, the instrument and research model will further be tested for validity and reliability; the data will be analyzed and the descriptive and conceptual findings of the study will be discussed.

CHAPTER SIX

FINDINGS AND ANALYSIS I: INSTRUMENT VALIDATION

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FINDINGS AND ANALYSIS I: INSTRUMENT VALIDATION

> *"Within the positivist, quantitative arena of research, the very scientific basis of the [IS] profession depends on solid validation of the instruments that are used to gather the data upon which findings and interpretations are based.... As a field, we are far from laying to rest the issue of instrument validation. The field still has ground to cover to make rigorous and credible the instruments used to conduct quantitative, positivist IS research" (Boudreau, Gefen and Straub, 2001:1,11).*

6.1 INTRODUCTION

The research survey yielded 150 usable responses. Before proceeding with analysis of the collected data, it is essential to ensure that the data is free from non-response bias and that the instrument does not suffer from measurement error, that is, it is sufficiently valid and reliable. This chapter discusses the steps undertaken to check for non-response bias and the various tests for validity and reliability.

Based on the results of the instrumentation process, the theoretical hypotheses developed in chapter four are re-evaluated and the research model reconstructed. The values for the research variables for further analysis are then derived by computing the average scores of the items that describe (load into) the respective research variables. Finally, the results of the instrumentation process are discussed.

6.2 SURVEY RESPONSES

6.2.1 Questionnaire Returns

The survey was conducted in two rounds for a total of 120 days. Follow-up efforts were undertaken through e-mail and telephone (Details in Chapter 5). After 120 days, a total of 150 usable responses were obtained for subsequent analysis. Table 6.1 provides a summary of the response rate.

Despite implementing most of the classical measures to boost response, the response rate achieved is 22%. While this figure looks small, the actual number of usable responses attained, 150, is quite significant and falls within the range of the MRSS. In fact, compared to the response rates of related studies in a similar (see MbWsoft, 2000) and a different setting Tabor, 2000), the response achieved in this study is relatively high. It is also comparable to response

rates reported in the IS literature (Pinsonneault and Kraemer, 1993). In general, the 150 usable responses should be considered as adequate and large enough for the desired statistical analyses.

Table 6.1 Summary of Survey Response Rate

A	Minimum returned sample size (MRSS)	150 to 200
B	Initial sample size used	1000
C	Refusals and unreachable	125
D	Initial response	147
E	Initial response rate (D/B-C)	16.8%
F	Response from second wave	22
H	Adjusted response rate (see Fowler, 1993:49) (D+2*F)/(B- C)	21.83%
I	Incomplete	19
J	Usable number of responses for analysis (D+F)- I	150

6.2.2 Estimating Non-response Bias

Before the data from the study can be generalized into the population, it is essential to determine whether or not the organizations that responded differed substantially from those that did not, that is, estimating non-response bias. The literature on non-response bias recommends a comparison of early respondents with late respondents, especially those that responded after the second wave was administered, on some key characteristics of the sample to estimate non-response bias (Thong, 1999; Armstrong and Overton, 1977). This test, which is also referred to as *extrapolation* (Armstrong and Overton, 1977), is based on the assumption that late respondents are likely to have characteristics similar to those of non-respondents.

There does not appear to be a literature that discusses how to select the characteristics that are to be used for comparing early and late respondents. It appears that such selections are at the discretion of individual researchers. However, since this study is about eCommerce, it is anticipated that the companies' current eCommerce status could be one characteristic that might affect response. Armstrong and Overton (1977) refer to this as the "interest hypothesis", that is, people who are more interested in the subject of the questionnaire respond more readily than those who are not.

In addition, organizational characteristics such as employee number, annual revenue, sector and measures of the key constructs of the study (awareness, human resources, business

resources, technology resources, commitment, governance, satisfaction with eCommerce performance) are also used for comparing early respondents with late respondents in order to estimate the non-response bias.

The t-tests (Table 6.2) indicate that at the 5% significance level, there is no major difference between the two groups of respondents in terms of the above characteristics♦. Therefore, this suggests that non-response bias is not a problem and one can make safe generalizations from the sample to the population.

Table 6. 2 Non-response Bias Estimate

	Mean		T-value	*P*	Std. Dev.	
	Early Respondent	Late Respondent			Early Respondent	Late Respondent
eCommerce status	3.57	3.95	-1.66	0.10	0.85	0.84
No. of employees	3.03	3.55	-1.78	0.08	1.20	0.80
Sector	5.66	5.18	0.61	0.54	3.20	2.15
No. of years in business	3.23	3.32	-0.29	0.78	1.19	1.09
Revenue	5.24	5.90	-1.83	0.07	1.64	0.30
Awareness	2.76	2.41	1.26	0.21	0.89	1.22
Human resources	3.09	2.86	0.72	0.48	1.17	1.08
Business resources	2.96	2.97	-0.09	0.92	0.72	0.58
Technology resources	2.59	2.48	0.45	0.65	0.89	0.86
Commitment	2.69	2.40	0.83	0.43	0.98	0.93
Governance	3.12	2.62	1.60	0.12	0.87	0.81
eCommerce Satisfaction	2.89	2.92	-0.08	0.93	1.23	0.95

6.3 INSTRUMENT VALIDITY AND RELIABILITY

Measurement error represents one of the most significant sources of errors in survey research. This error affects both the quality of the data and the findings of the study. While measurement error is almost inevitable (Grover, 1997) and is a function of degree rather than "all-or-none" property (Nunnally, 1970), validation and reliability techniques could be used to reduce errors caused because of measurement.

Validity ensures that an instrument measures what it is intended to measure. On the other hand, reliability checks whether a measure can produce the same result on repeated occasions (De

♦ For scales used to assess eCommerce status, number of employees, sector, number of years in business, and revenue, refer to Appendix 5D.

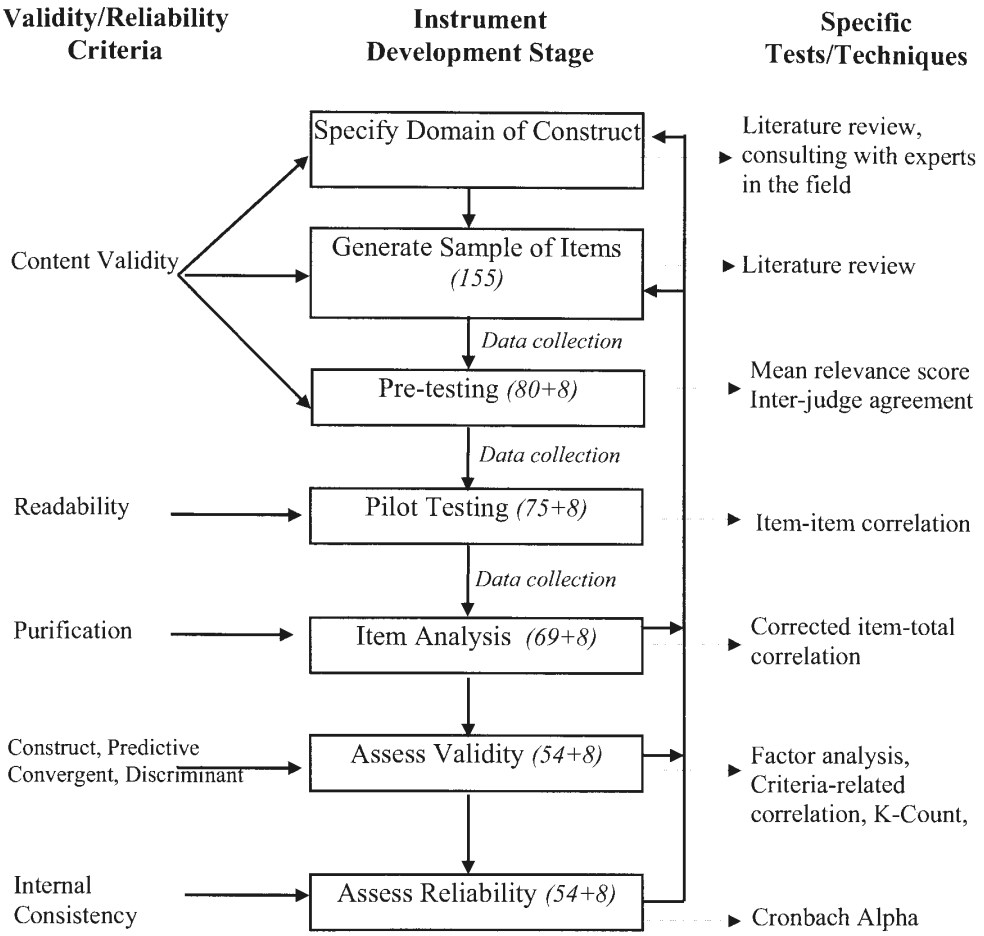
Vaus, 1995). Further, while a valid measure is always reliable, the converse is not always true (Churchill, 1979; Nunnally, 1970). Based on the recommendations of the literature on instrument validation (Bourdreau et al, 2001; Grover, 1997; Palvia, 1996; Straub, 1989; Churchill, 1979; Nunnally, 1970) content, construct, predictive, convergent and discriminant validity checks and internal-consistency reliability assessments were performed.

The research works with three identifiable concepts: internal (organizational) eReadiness; external (environmental) eReadiness, and eCommerce success. Each of these concepts has several constructs. In such a situation, Churchill (1979) and Nunnally (1970) recommend that validity and reliability assessments should be conducted separately for each concept. This would, for example, prevent a factor analysis from producing superficial dimensions, that is, dimensions that do not represent any common construct. In addition, if all the items are analyzed simultaneously (such as in factor and item analyses), the sample size (150) might be apt to produce an unstable solution (Barki and Hartwick, 1994).

The above recommendation on performing separate analyses in a situation where the research works with identifiable research concepts and constructs has widely been practiced by IS and eCommerce researchers (see for example Wang and Tong, 2001; Heijden; 2000; Palvia, 1996; Saarinen, 1996; Thong, 1999; Moore and Benbasat, 1991) and is therefore adopted in this research.

In general, Figure 6.1 provides an overview of the instrument development and validation process, which will be followed by detailed discussions of the validity and reliability tests. The numbers in parenthesis of Figure 6.1 represent the number of items in the instrument after each stage of the instrument development and validation process.

Figure 6.1 Overview of the Instrument Development and Validation Process



6.3.1 Content Validity

Content validity rests mainly on the adequacy with which the content has been sampled from a universal pool. Because of the infinity of the universe of possible content, a content valid instrument is difficult to create and perhaps even more difficult to verify (Churchill, 1978). Nunnally (1970) states that one should ensure content validity by the plan and procedures used to develop the instrument. He suggests two standards for ensuring content validity- *(1) a representative collection of items and (2) "sensible" methods of test construction.* The following actions were taken in order to ensure content validity of the instrument in this research (for details refer to section 5.3 in Chapter five).

- The domain of constructs was well defined.
- Existing literature was consulted and where appropriate, items were borrowed from the existing instruments.

- A relatively large number of items (initially 155) were pooled.
- A panel of judges was used to rate the relevance of the items on the earlier version of the instrument (pre-testing). Cronbach (1971) suggests a review process whereby experts in the field familiar with the content universe evaluate versions of the instrument until a form of consensus is reached.
- To assess the consensus, inter-rater agreement was evaluated using correlation coefficients among the different judges (Litwin, 1995) and mean relevance score was computed to identify items that needed to be eliminated from the instrument (Straub, 1989).
- All the statements were stated as positive statements (Zmud et al, 1982).
- The widely accepted, (by IS researchers), agreement–disagreement scale for measuring assessments (attitude, behavior, perception, etc) was used.

6.3.2 Instrument Readability

The model was pilot tested for readability and preliminary reliability assessment. The purpose was to establish the basic soundness of the instrument before full study and to eliminate "*logically duplicative*" items (Palvia, 1996). As a result of this process four items were eliminated from the instrument (refer to details in Section 5.3 of Chapter five).

6.3.3 Item Analysis/Reliability Estimate (Measure Purification)

Some researchers like to determine the dimensions underlying the research constructs (construct validity) by performing a factor analysis on the data before doing anything else. Churchill (1979) contends that when factor analysis is conducted before purification, the result tends to produce many more dimensions than can be conceptually identified. This effect is partly due to the "garbage items", that is, items which do not have the common core, but which do produce additional dimensions in a factor analysis. Accordingly, the first step one should take to assess the quality of an instrument is to calculate coefficient alpha and item-to–total correlation (henceforth known as item-scale), which will be used as a criterion to delete garbage items (Churchill 1979; Cronbach, 1971).

The corrected item-scale correlations were plotted in descending order (Appendix 6A) and items with item-scale correlation below 0.4 or whose correlations produced a substantial or sudden drop in the plotted pattern and which would raise the alpha if deleted were eliminated.

The cutoff is judgmental and Churchill's (1979) suggestion is to eliminate items with item-scale correlation *"near zero"*. However, the cutoff used is comparable to cutoffs used by researchers in similar exercises (Wang and Tang, 2001; Palvia, 1996).

As the result of the item analysis process, six items were dropped from the instrument (Table 6.3). The correlations with the corrected item-scale ($r \geq 0.4$) were significant at $p = 0.05$. Thus the cutoff values were considered high enough to ensure that the items retained were adequate measures of the constructs.

Table 6.3 Item/Reliability Analysis (Measure Purification) Summary

Category	Before deletion		Items to be deleted	After deletion	
	No. of items	Cronbach Alpha		No. of items	Cronbach Alpha
Organizational eReadiness	46+6♦	0.93	A1, A8, R3, R13	42+6	0.93
External eReadiness	11+1	0.78	GVER6	10+1	0.78
ECommerce Success	18+1	0.89	SDP2	17+1	0.89

The Cronbach alpha values satisfy the highest minimum criterion (0.8, approximated to one digit) of reliability (Nunnally, 1978). The scores are high enough to suggest evidence of initial reliability to proceed with further validity investigation. Subsequent validity tests are then targeted to ensure instrument parsimony and validity by eliminating redundant items from the instrument.

6.3.4 Construct Validity

The stages followed hitherto in developing the instrument should produce a measure, which is content or face valid and reliable. However, it may or may not produce a measure, which has construct validity. Construct validity is most directly related to the question of what the instrument actually measures- what constructs, traits, or concepts? Construct validity asks whether the measures chosen are true constructs that describe an event or whether they are merely artifacts of the methodology itself (Straub, 1989). Confirmatory or principal component factor analysis can be used to assess construct validity (Nunnally, 1978). The general criterion is that if the items for each variable load together in factor analysis but do not cross load onto other factors, then there is evidence of construct validity.

♦ The "+6, and +1" represent control variables in each construct.

Principal component analysis was used to test the construct validity of the instrument. The following factor extraction rules (Hair et al, 1995; Straub 1989) were implemented:

1. Casewise deletion of missing data.
2. Excluding control and global variables from factor analysis.
3. Using a minimum eigenvalue of 1 as a cutoff value.
4. Dropping items with a factor loading less than 0.5 on all factors from subsequent iterations.
5. Dropping items with a factor loading greater than 0.5 on two or more factors from subsequent iterations.
6. Exclusion of single item factors for the sake of parsimony.
7. Component wise with Varimax raw rotation

The iterative sequence of factor analysis and item deletion was repeated for each of the three concepts –organizational eReadiness; external eReadiness and eCommerce success (Appendix 6B). While the above criteria have generally been applied in extracting the factors, for the dependent variable (eCommerce success) we used a higher-level factor-loading criterion (0.60). This relatively stringent criterion for the dependent variable was used in order to get a few highly significant measures.

Using the iterative sequence of factor analysis (Appendix 6B), nine items from the organizational eReadiness category and six items from the eCommerce success category were eliminated. After eliminating the items using the above set of criteria, the factor analysis resulted in a final instrument of 33 items plus 6 control variables representing 9 distinct factors for organizational eReadiness; 10 items plus one control variable in three factors for external eReadiness and 11 items plus one control variable representing four distinct constructs for eCommerce success.

The factor analysis for the organizational and external eReadiness dimensions further indicates that except for one variable (C8-our employees at all levels support our eCommerce initiatives), which was expected to load to the commitment variable but rather load to the governance variable, the rest of the items uniquely load into their hypothesized variables. Accordingly, for the subsequent analysis, C8 was included within the governance construct. However, for the dependent variable (eCommerce success) the measures for success of deployment did not satisfy the rules set for factor extraction. Therefore, the success of

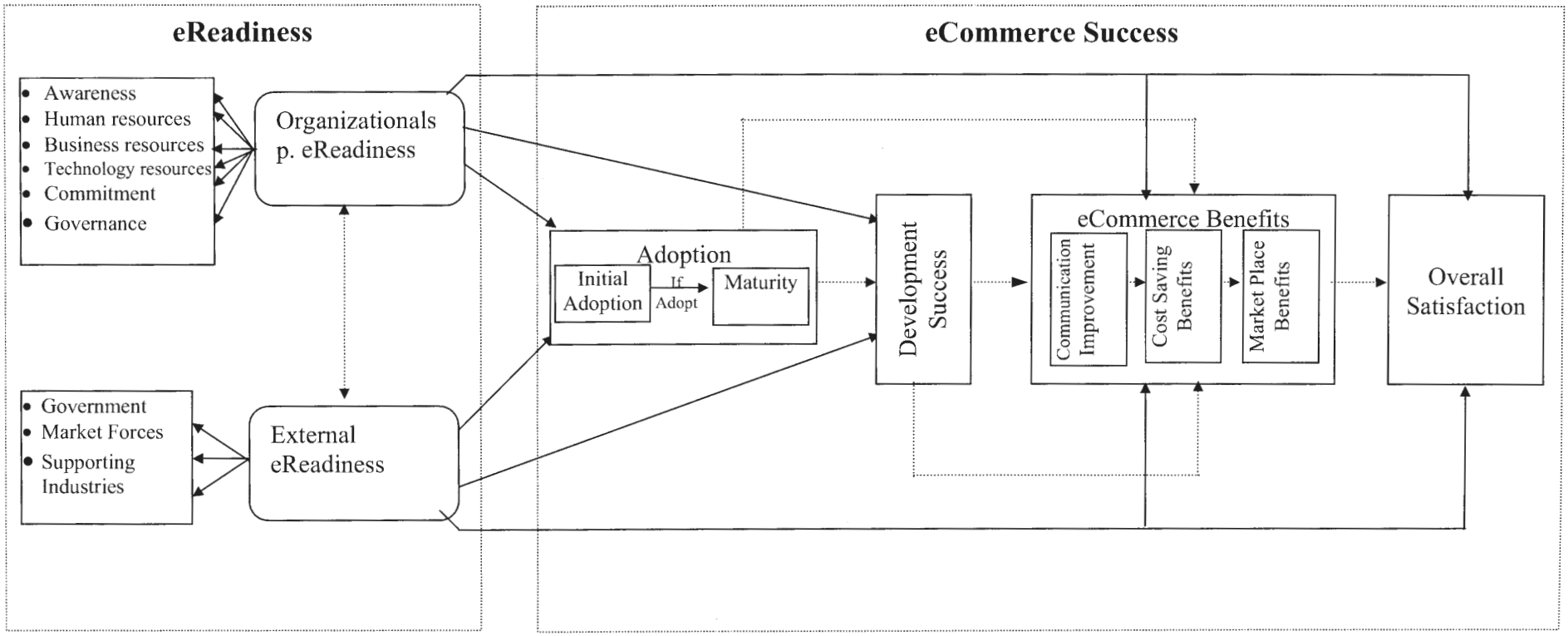
deployment variable had to be dropped and did not form part of the subsequent analysis in this research. Future research needs to look into developing better measures to operationalize this particular construct. The factor analysis of the dependent variable also resulted in three distinct constructs being evident in the measurement of eCommerce benefits. These are subsequently named as communication improvement, cost saving benefit and market place benefit. Table 6.4 summarizes the results of the factor analysis exercise.

Table 6. 4 Summary of Factor Analysis

Construct	Items	No of Items
Organizational eReadiness		
Awareness	A2, A3, A4, A5, A7, A9, A10	7
Human Resources	R1, R2	2
Business Resources	R6, R7, R8, R9, R11, R12	6
Technology Resources	R14, R17, R20, R22, R23	5
Commitment	C1, C2, C3, C4, C5	5
Governance	C8, G1, G2, G3, G6, G7, G8, G10,	8
External eReadiness		
Market Forces	MFER1, MFER2	2
Government	GOVER2, GOVER3, GOVER4, GOVER5	4
Supporting industries	SIER1, SIER2, SIER3, SIER4	4
eCommerce Success		
Development	SDV1, SDV2	2
Communication improvement	SBN12, SBN13	2
Cost Saving benefits	SBN1, SBN4, SBN10	3
Market Place Benefits	SBN5, SBN6, SBN7, SBN9	4
Control Variables	A11, R5, R16, R23, C9, G11, EGlobal, SGlobal	8

In general, the significant loading of the items on single factors indicates the unidimensionality of each construct, while the fact that cross-loading items were eliminated supports the discriminant validity (see next section) of the instrument. Figure 6.2 depicts the revised research model following the construct validity assessment. The model depicted in figure 6.2 will be used in subsequent chapters in order to construct and test the different hypotheses in exploring and understanding the nature of the relationship between eReadiness and eCommerce success and identifying the eReadiness factors that affect the different facets of success.

Figure 6.2 Revised research model of eReadiness and eCommerce success♦



♦ Dotted lines represent possible relationships but that are not to be tested in the current study.

6.3.5 Convergent and Discriminant Validity

Convergent and Discriminant validity are components of construct validity and refer to whether the measure is similar within itself and yet sufficiently different from other measures. The correlation matrix approach (Wang and Tang, 2001; Palvia, 1996; Doll and Torkzadeh, 1988) was applied to evaluate the convergent and discriminant validity of the instrument developed herein.

6.3.5.1 Convergent validity

Evidence about the convergent validity of a measure is provided in the validity diagonal (items of the same factor) by observing the extent to which the correlations are significantly different from zero and sufficiently large enough to encourage further investigation of discriminant validity. Appendix 6C presents the measures correlation matrix. The smallest within-factor (intra-factor) correlation for each factor is awareness, 0.32; human resources 0.77; Business resources 0.30; technology resources 0.45; Commitment 0.48; Governance, 0.37; Market forces eReadiness 0.63; Government eReadiness 0.28; Supporting industries eReadiness 0.30; success of development 0.71; cost advantage 0.41; communication improvement 0.50; and market place advantage 0.66. These correlations are significantly higher than zero and large enough to proceed with discriminant validity analysis

6.3.5.2 Discriminant validity

Discriminant validity refers to the degree to which a variable differs from other variables. To claim discriminant validity, an item should correlate more strongly with other items of the same variable than with items of other variables. For each of the items, discriminant validity is tested by counting the number of times (K) that the item correlates higher with items of other factors than with items of its own factor.

For example, the lowest item-factor correlation for A4 is 0.47 and this correlation is higher than A4's 26 correlations with items of all other variables within the organizational eReadiness dimension, that is, the value of K equals zero. To provide evidence of the discriminant validity of a measure, Campbell and Fiske, 1959 (in Wang and Tang, 2001; Palvia, 1996) suggest that the value of K should be less than one-half of the potential comparisons. Table 6.5 summarizes the values of K from all the comparisons.

Table 6.5 Summary of K-count to Test Discriminant Validity

Category	No of items	No. of Comparisons for each item in the scale	Maximum Acceptable K	Observed Values of K										Instances of Validity Violation
				0	1	2	3	4	5	6	8	9	13	
Awareness	7	26	13	2		4						1		-
Human Resources	2	31	15	2										-
Business Resources	6	27	13	1				1		1	1	1	1	-
Technology Resources	5	28	14	3	1	1								-
Commitment	5	28	14	1	1		3							-
Governance	8	25	12	1		2	3	1	1					-
Government	4	6	6	3	1									-
Market Forces	2	8	4	2										-
Supporting Industries	4	6	6	2	1	1								-
Success of Development	2	9	4	2										-
Communication Improvement	2	9	4	2										-
Cost Saving Benefit	3	8	4	3										-
Market place benefit	4	7	3	4										-
Total	54			28	4	8	6	2	1	1	1	2	1	-

An examination of both Table 6.5 and the correlation matrix (Appendix 6C) from which the table was drawn reveals no violations of the discriminant validity in a total of 1038 comparisons. In fact, K is zero for 28 (52%) of the items and approached the threshold point in only one of the cases (namely R9–availability of policy that encourages grass roots eCommerce initiatives).

Thus, there is sufficient evidence of both convergent and divergent validity and therefore the instrument can be considered as adequate to generate quality data in the current investigation. However, before proceeding with final reliability assessment, the instrument's validity is ought to be evaluated for predictive validity.

6.3.6 Predictive Validity

Predictive validity means that the instrument distinguishes the different cases such as those with high capabilities from those without. Correlations between the developed scales and control variables were used to study the predictive power of each of the constructs (Saarinen, 1996). Table 6.6 provides a summary of the correlation matrix.

Table 6.6 Predictive Validity Statistics Summary

	CONTROL VARIABLES							
Research Variables	**A11**	**R5**	**R16**	**R24**	**C9**	**G11**	**EGLOBAL**	**SGLOBAL**
Awareness	**0.793**	0.447	0.428	0.328	0.442	0.295	0.295	0.149
Human Resources	0.382	**0.616**	0.342	0.338	0.383	0.340	0.155	0.134
Business Resources	0.490	0.491	**0.681**	0.471	0.468	0.295	0.269	0.321
Technology Resources	0.466	0.500	0.598	**0.801**	0.392	0.412	0.240	0.244
Commitment	0.464	0.533	0.380	0.433	**0.728**	0.609	0.265	0.252
Governance	0.498	0.554	0.413	0.484	0.641	**0.755**	0.264	0.123
Government	0.060	0.246	0.186	0.286	0.056	0.191	**0.472**	0.263
Market Forces	0.214	0.384	0.214	0.348	0.387	0.229	**0.549**	0.261
Supporting Industries	0.130	0.252	0.187	0.256	0.101	-0.024	**0.538**	0.120
Success of Development	0.290	0.349	0.369	0.361	0.233	0.386	0.160	**0.361**
Communication Improvement	0.173	0.172	0.238	0.296	0.230	0.272	0.258	**0.210**
Cost saving benefits	0.122	0.264	0.230	0.174	0.257	0.333	0.369	**0.333**
Marketplace benefits	0.158	0.248	0.189	0.256	0.395	0.340	0.071	**0.354**

All correlations between the major research constructs and their respective control variables in the organizational eReadiness and external eReadiness dimensions are quite high and significant at the 0.05 level, thereby showing evidence of predictive validity (Bold faces in

Table 6.6). For the eCommerce success dimension, following recommendations in the IS success literature (Palvia, 1996; Saarinen, 1996; Miller, 1989; Doll and Torkzadeh, 1988) this study used "satisfaction with the performance of e-commerce" (SGLOBAL in Table 6.6) as a control variable. While three of the variables show significant correlation at 0.05 to this control variable, the magnitude of the correlation is not high. In addition, the correlation between communication improvement and the control variable- satisfaction with the performance of e-commerce is not significant at 0.05 level. This observation could be related to difficulties in the satisfaction construct and its sensitivity to hygienic factors. In general, despite the minor problems, the correlation results in Table 6.6 provide support for predictive validity.

6.3.7 Final Reliability

One of the most widely and commonly used indicators of instrument reliability is internal consistency reliability (Wang and Tang, 2001; Boudreau et al, 2001; Straub, 1989). It is an indicator of how well the different items measure the same concept. The recommended measure of the internal consistency is provided by the coefficient alpha (Churchill, 1979; Nunnally, 1970).

The final instrument consists of 54+ 8 items with a reliability of 0.94. That is 33+6 items for measuring the organizational eReadiness with a Cronbach alpha of 0.93; 10+1 items for external eReadiness with a Cronbach alpha of 0.79 and 11+1 items for assessing eCommerce success with a Cronbach alpha of 0.83 (See Appendix 6D).

Compared to the earlier reliability estimates (Table 6.3), the reliability coefficient remains the same for the organizationalsp. eReadiness category; marginally increases for the external eReadiness category and declines for the success category. The decline in the reliability coefficient for the success category might be due to the stringent factor analysis test used to reduce the number of items, since the Cronbach alpha coefficient tends to increase with the number of items. Table 6.7 shows the reliability values for each of the research variables.

According to Nunnally (1967), a minimum alpha of 0.5 to 0.6 is sufficient for early stages of basic research. Hair et al (1995), on the other hand, suggests a minimum alpha of 0.7 and above. However, Nunnally's (1970) recommendation of Cronbach alpha of 0.80 for basic research and 0.90 for applied research appears to be widely accepted in the literature. As shown in Table 6.7, all the reliability coefficients satisfy the minimum criteria suggested by

both Nunnally and Hair et al. In addition, the research variables' reliabilities are consistently close to their respective overall reliabilities of 0.93, 0.79 and 0.83, and there is very little variation among the individual reliabilities within each of the three dimensions. This shows that the measure is sufficiently reliable and can consistently capture true score variability among the respondents.

Table 6.7 Instrument Reliability

Research Variable *Major construct*	**No. of items**	**Cronbach alpha**
Awareness	7	0.89
Human Resources	2	0.87
Business Resources	6	0.81
Technology Resources	5	0.85
Commitment	5	0.88
Governance	8	0.91
Organizational eReadiness	*33+6*	*0.93*
Market Forces	2	0.78
Government	4	0.77
Supporting Industries	4	0.75
External eReadiness	*10+1*	*0.79*
Success of Development	2	0.83
Cost Benefit	3	0.79
Communication Benefit	2	0.75
Market place benefit	4	0.86
eCommerce Success	*11+1*	*0.83*
Overall	**54+8**	**0.94**

6.4 SUMMARY AND CONCLUSION

This chapter presented the tests for non-response bias and the instrument validation process. The t-test statistics shows that non-response bias is not a major problem in the research and it is possible to make safe generalizations from the sample to the entire population. However, extending this generalization to other developing countries needs to be undertaken with caution and with proper evaluations of the broader context. The South African context within which this study was conducted is briefly described in Appendix I. This should inform any attempt to infer from the findings of this research to other contexts.

The survey instrument used is developed and validated for the first time for the purposes of this study. In some cases, items were borrowed from previous measures. The instrument has undergone through various tests in order to examine its psychometric properties.

In summary, this chapter argues that the revised model with an overall reliability of 0.94 represents a progress towards identification, measurement, operationalization and validation of organizational and environmental eReadiness variables that affect the different facets of e-commerce success in developing countries. This is a step towards understanding the eCommerce phenomenon in developing countries and the different factors that affect its adoption, development and benefit. The plan and procedure used in pooling the initial list of items supports the fact that the model is internally consistent.

The iterative factor analysis approach and the consistent rules followed to extract the factors provide evidence that the variables are not simple artifacts of the research and can actually be found in reality (construct validity). The subsequent data analyses support convergent and discriminant validity of the revised model and the predictive validity of the scales. Furthermore, the model appears to have more than adequate overall reliability as well as more than adequate variable-specific reliabilities across all the research variables.

However, further efforts are required to improve the model and the instrument. In particular, additional items should be introduced to improve the coverage and reliability of the external eReadiness measures. Moreover, success as a research construct is a difficult concept to operationalize due both to its multidimensionality and the non-complementary nature of the criteria used to make such assessments.

In this study, we approached success as a four-facet construct of adoption, development, deployment and benefits. The items used to operationalize success of deployment did not pass the tests for validation and thus the construct had to be dropped from the investigation.

Future research should also attend to identifying better measures to operationalize this particular construct. In addition, the study has relied on transactional cost, network externalities and market reach theories to operationalize the benefit dimension of success. Again, future research needs to look into other salient benefits of eCommerce.

Further, a confirmatory analysis and a multi-country and cross-cultural validation using other large samples gathered elsewhere are essential for greater validation and generalization of this

novel model and instrument. Subsequent studies would also allow assessing the test-retest reliability of the instrument.

The next two chapters present and analyze the findings of the study based on the revised model, test the different hypotheses and discuss the results. For subsequent statistical analyses, the score for each composite research variable is the aggregate (mean) of the respondents' scores for items defined to measure that variable.

CHAPTER SEVEN

FINDINGS AND ANALYSIS II: eCOMMERCE IN SOUTH AFRICA

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CHAPTER SEVEN

FINDINGS AND ANALYSIS II: eCOMMERCE IN SOUTH AFRICA

For I dipped into the future, far as human as could see,
Saw the vision of the world and all the wonders that would be;
Saw the heavens fill with commerce, argosies of magic sails
(Alfred, Lord Tennyson IN Treese and Stewart, 1998)

7.1 INTRODUCTION

Businesses around the world are acting on the imperative of maximizing the economic and social potentials of eCommerce. Many public and private sector organizations including consulting firms and market research companies have conducted electronic commerce surveys in the past few years. The results have established a benchmark that provides an understanding of developments in this rapidly evolving field. Most of these studies are conducted in the developed West with large multinational companies. But large multinational firms are only part of the eCommerce story. Nevertheless, except for speculative arguments, empirical studies of the current status of eCommerce uptake in developing countries remain scant.

This chapter describes the demographic details of the organizations that responded to the survey of 150 businesses in South Africa. Having established in the previous chapter that non-response bias is not a problem, the chapter also explores from the responses the extent of eCommerce penetration in South Africa. This description provides a contextual understanding within which the research hypotheses are to be tested and evaluated. Finally, the findings are analyzed and discussed.

7.2 PROFILE OF BUSINESSES SURVEYED

The sampling frame and the sample were selected to ensure plurality of data sources in terms of size, sector and geographical distribution. As a result, a cross section of businesses responded to the survey. However, since the sampling criterion was systematic and not stratified sampling, any inference about sector and size should be made within the context of the sampling approach used.

7.2.1 Size

The number of full time equivalent staff (FTES) was used as an indicator of the size of the organizations surveyed. According to Statistics South Africa and the National Small Business Act 102 of 1996, businesses with 50 or less FTES are considered as small. Those with 50 to

100 FTES (maximum limit of 200 in mining, manufacturing and construction) are medium and the rest are considered as large. In terms of revenue, businesses with annual revenue of up to 10 million Rand (15 million in retail and 25 million in wholesale) are considered small. Those with annual revenue of 11 to 40 million Rand (4 million in agriculture and 50 million in wholesale) are considered as medium and the rest as large. For comparison, the Asia Pacific Economic Cooperation (APEC) treats businesses up to 99 employees as Small; 100 to 499 medium and 500 and above as large. Table 7.1 profiles the respondents in terms of size.

Table 7.1 Size and Annual Revenue Profile of Respondents

Size (FTES)	Number of businesses	Percentage	Annual Turnover in millions of Rand	Number of businesses	Percentage
50 or fewer	23	15	<11	12	8
51 to 100	11	7	11 to 40	11	8
101 to 200	20	13	41 to 50	6	4
201 and over	95	63	> 51	115	76
Not Stated	1	1	Not stated	6	4
Total	150	100	Total	150	100

As shown in table 7.1, survey respondents were somehow distributed across all sizes. However, according to the South African classification, more than 60% of the businesses responded to the survey represent large business. It has to be recalled that this research has not considered business size as a research variable nor was the sampling framework designed based on equal representation of small and large businesses. Although, large businesses represent a smaller proportion of the total population of businesses in South Africa, the relatively higher percentage of returns from large businesses (60%) could be explained by the randomness of the sample selection criteria. Nonetheless, even if it was established that businesses can appear on the directory used to draw the sample purely on voluntary basis, it can be speculated that larger businesses might tend to see the value of inclusion in such directory. As a result, the directory might have included (but establishing this factually was out of the scope and focus of this study) more large businesses than their smaller counterparts.

7.2.2 Sector

The Standard Industry Classification (SIC) was used in order to capture the sector of the organizations surveyed. Table 7.2 summarizes the result. As shown in table 7.2, survey respondents were widely distributed among all sectors. The majority of them however belong

either to the non-electronics and non-computers manufacturing sector (26%) closely followed by the financial services (26%). In general 58% of the respondents were from three sectors: electronics/computers and communications, financial services and manufacturing.

Table 7.2 Sector Demographics of Surveyed Businesses

Sector	No. of Respondents	Percentage
Agriculture	8	5
Construction	8	5
Electronics/computers and communications	16	11
Financial services	32	21
Manufacturing	39	26
Media/marketing/consulting	13	9
Mining	10	7
Retail	7	5
Transportation	7	5
Tourism and entertainment	3	2
Wholesale	6	4
Others	1	1
Total	150	100.00

7.2.3 Number of Years in Business

In terms of the number of years the respondents have been in business, the interest was to assess how established the businesses were. Such information gives an idea of the possible existence of legacy systems and organizational inertia, which are logically and characteristically features of established businesses. Table 7.3 profiles the number of years the respondents have been in business. The majority of the respondents have been in business for over 20 years. This clearly provides an opportunity to investigate how well established businesses respond to the issues of eCommerce.

Table 7.3 Respondents Profile by the Number of Years in Business

No. of Years in Business	No. of Respondents	Percentage
10 or less	24	16
11 to 20	16	11
21 to 30	18	12
Over 31	92	61
	150	100

7.2.4 Respondent Designation

The unit of analysis in the study was the organization. The respondents selected should therefore truly represent this unit of analysis and should also be in a position to provide a

holistic assessment of the organization and the environment in terms of the research variables. The survey mainly targeted the managing directors of the organizations. Table 7.4 provides the designation of the managers who completed the questionnaire.

Table 7.4 Positions of the Respondents

Position	Number	Percentage
Managing Director/General Manager/CEO	78	52
Deputy Managing Director/ Deputy General Manager	18	12
Director/Department Manager	50	33
Others	4	3
	150	100

More than 50% of the respondents were the managing directors, or their equivalent, of the surveyed organizations. Of the 33% directors, 16% were eCommerce directors; 36% finance directors, 40% Chief Information Officers (IT directors) and 8% marketing directors. In general, the above profile indicates that the respondents satisfy the criteria and assumption of the study and can truly represent the unit of analysis.

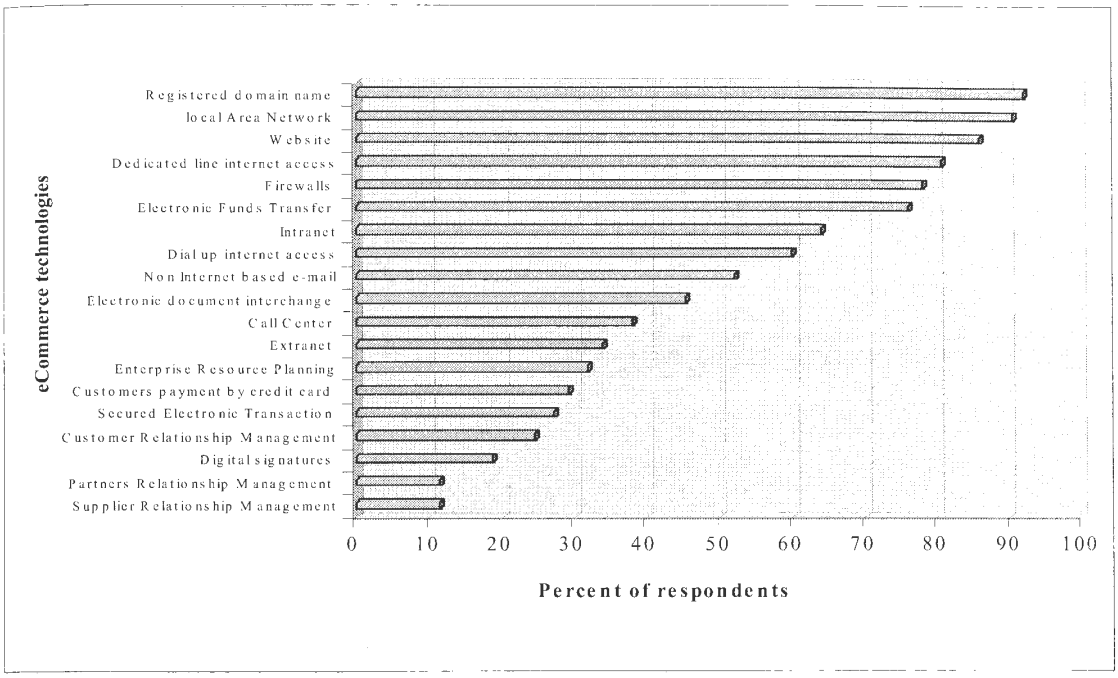
7.3 STATUS OF eCOMMERCE IMPLEMENTATIONS

As indicated in the previous section, most of the businesses satisfy the large business criterion under the South African classification and have been in business for over 20 years. Such organizations are expected to have international dealings and to stay competitive they must keep apace with global changes in the conduct of business. In order to assess the issues of current eCommerce penetration and in order to inform the hypotheses analyses in the next chapter, the study surveyed the current implementation of eCommerce technologies and business functions performed online and future plans within the next two years.

7.3.1 Currently Implemented eCommerce Technologies

A range of eCommerce enabling components (that falls under the hard and soft infrastructure layers of the quasi-hierarchical framework introduced in Chapter 2) does exist. Conventionally, these components could generically be classified as computing and network backbone, access, communication (electronic messaging), publishing, payment and financial transfer, security, and integrated applications (Korper and Ellis, 2000; Treese and Stewart, 1998; Kalakota and Whinston, 1996). Current implementation of the 19 different components that could be classified in the above categories was investigated. The findings are described in Figure 7.1.

Figure 7.1 eCommerce Technologies Currently Implemented



Of the 19 components, the eCommerce components that demonstrate the weakest uptake relate to integrated applications and security technologies. Only 11% of the respondents have implemented supplier relationship management, another 11% partners relationship management. Similarly, only low proportions of respondents are currently implementing security technology, that is, digital signatures (19%) and secure electronic transaction (27%).

Most of the respondents have their own domain name and/or website (90%) and access to the Internet through a dedicated connection (86%). This figure is approaching a saturation level and is very promising even when compared to some of the developed countries. For example, an August 2000 survey in New Zealand and Australia found only 33% and 26% adoption rates respectively for domain name or Website and projected a 20% annual increase. On this basis, even allowing for the projected growth, it appears that South African businesses have a higher adoption rate of domain names and websites. However, this comparison among the figures should make due allowances for the differences in the sample organizational sizes.

Of all the sectors surveyed, the manufacturing sector appears to show the most aggressive stance (Table 7A.1 in Appendix 7A). However, this should not be taken at face value because of the unequal distribution of the respondents across the sectors. A close examination of

within-sector percentage distribution of the implemented technologies (Table 7A.1 in Appendix 7A) reveals no single leading sector in terms of implementing the components and all sectors tend to be at a relatively similar stage. Again, this finding should be interpreted by making allowances for the number of respondents in each sector.

Significant variation in implementing the components appears to be observed between small and medium businesses and their larger counterparts, with larger businesses leading the implementation ahead of the smaller ones especially in the integrated application categories (Appendix 7A, Table 7A.2). However, the trend of implementation of the components within each size category (Table 7A.2, Appendix 7A) shows no major difference and the same trend is observed across business sizes. That is, access and computing technologies show the strongest uptake whereas security technologies and integrated applications show the weakest. In addition the level of implementation of the components within each category remain fairly the same. For example Websites are implemented by 83% of SMEs and 87% of large businesses; 19% of SMEs and large businesses respectively implemented digital signature technology.

7.3.2 Business Functions Performed Electronically

The literature review in chapter two has established that the practice of eCommerce dates several years back and most businesses have been engaged in some form of eCommerce. It was also established that in the history of eCommerce, it is possible to identify non-Internet based eCommerce and Internet based eCommerce. While business functions like buying and selling, order-taking, transmission and receipt of payments have been accomplished electronically using old hat technologies such as fax, electronic data interchange and electronic funds transfer, Internet based eCommerce has revolutionized the way these functions have been performed and provides a new channel for such functions as marketing, publishing, advertising, market research and public relations.

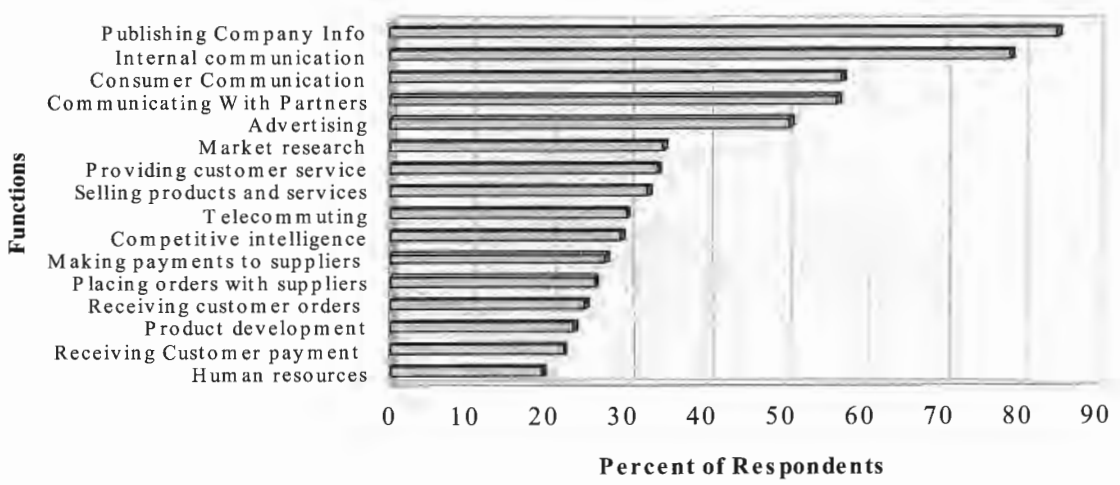
The use of Internet based electronic tools for performing 16 business functions was assessed (Figure 7.2 and Appendix 7B, Table 7B.1). The 16 functions could generically be classified into public relation, communication, marketing, procurement, human resources and telecommuting.

Three of the top five business functions currently performed electronically using Internet based networks relate to communication, namely internal communication (79%), customer communication (57%) and communication with partners (57%). While many organizations are using the Internet for publishing their information (85%), and some advertising (51%) and customer service (34%) activities, very few are using the channel for transactional services such as order taking (25%), procurement (26%), payment (22%) and house keeping activities such as human resources management (19%). This pattern shows no significant difference across sectors (Appendix 7B, Table 7B.1) and business sizes (Appendix 7B, Table 7B.2).

7.3.3 eCommerce Maturity

Capturing current usage of eCommerce technologies and electronically performed business functions provides a benchmark of the surveyed organizations' current positioning. The study also investigated how much progress organizations have made in the past and how much progress they are likely to make in the future in incorporating eCommerce into their operation. In chapter three, it was argued that organizations could not become eCommerce affluent overnight and follow certain migration paths, but not necessarily in a linear fashion. It was also argued that maturity models help to identify the stages organizations walk through in terms of adoption and implementation of eCommerce.

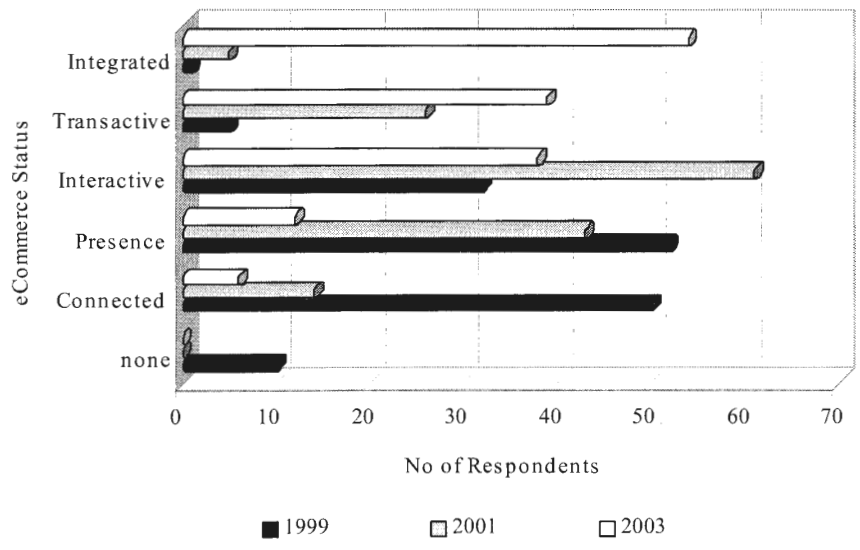
Figure 7.2 Business Functions Performed Electronically



A six-stage maturity model was used to assess the changes in the eCommerce status of the respondents as they migrate into the electronic world. The model was used to assess where the businesses were two years ago; where they are currently positioned and where they expect to be in two years time. Figure 7.3 describes the eCommerce status of the respondents at these three points in time.

Figure 7.3 (and Appendix 7C, Table 7C.1) reveals a clear distinction in terms of the eCommerce status of the businesses in the three time periods. By 1999, only 1% of the respondents had achieved an integrated eCommerce status. This figure is expected to change to 36% by the year 2003. Similarly, the majority of the respondents (61%), up from 31% in 1999, currently have an interactive eCommerce system and use their web system to accept queries, e-mail and form-entry from users and 20% are actually selling and purchasing products and services including rendering customer service from their Websites. This figure was only 31% in 1999. By 2003, an estimated 62% of the businesses will achieve a transactive and integrated eCommerce status. An interesting finding is also that all of the respondents across sector and size (up from 91% in 1999) are currently connected to the Internet either through a dialup link or a dedicated line and connectivity appears to have reached saturation level.

Figure 7.3 eCommerce Status of Respondents



In terms of sector-wise (intra-sector) eCommerce status (Appendix 7C, Table 7C.2), the agriculture and the retail sectors appear to lag the rest, with the majority of the businesses in

the agriculture (63%) and retail (57%) sectors reported as being connected to the internet or to have achieved a static web presence only. Of all the industries surveyed, the financial sector, with 44% of the businesses currently demonstrating a transactive and integrated eCommerce status, leads the rest.

No significant difference has been observed in terms of the current eCommerce status of the respondents due to business size (Appendix 7C, Table 7C.3). An equal 62% of the respondents in each size category have an interactive or higher eCommerce status. This provides yet additional evidence of the earlier assertion that business size (conventionally measured by the number of employees) does not appear to considerably influence eCommerce uptake.

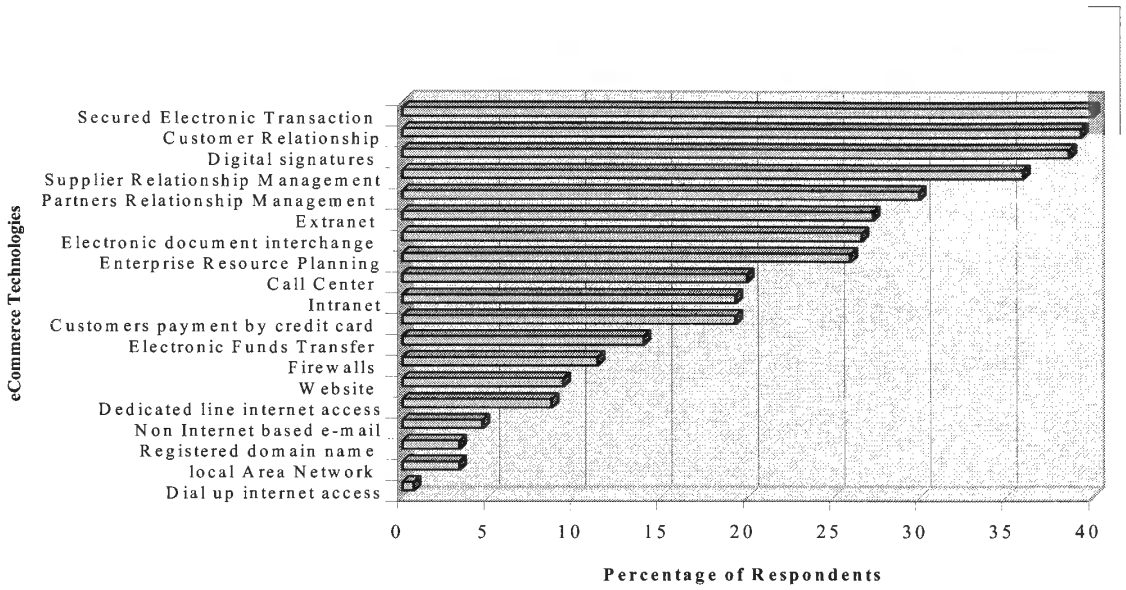
7.3.4 Charting the Future

In addition to assessing the current implementations of eCommerce technologies and electronically performed business functions, the future plans of the organizations were evaluated.

Significant plans are afoot for the implementation of eCommerce technologies. As Figure 7.4 and Table 7D.1 in appendix 7D indicate, the respondents are planning significant growth in the implementation of security technologies and back-to-back integrated applications within the next three years ending 2004. Within this time frame, an estimated 40 % of the respondents are planning to implement secured electronic transactions and digital signatures, 39% customer relationship management, 36% supplier relationship management, 30% partners relationship management and 27% extranet. This result is in line with the expected eCommerce maturity status of the businesses by 2003. Some of the planned implementations are small because of existing high penetrations, cf. Figure 7.1.

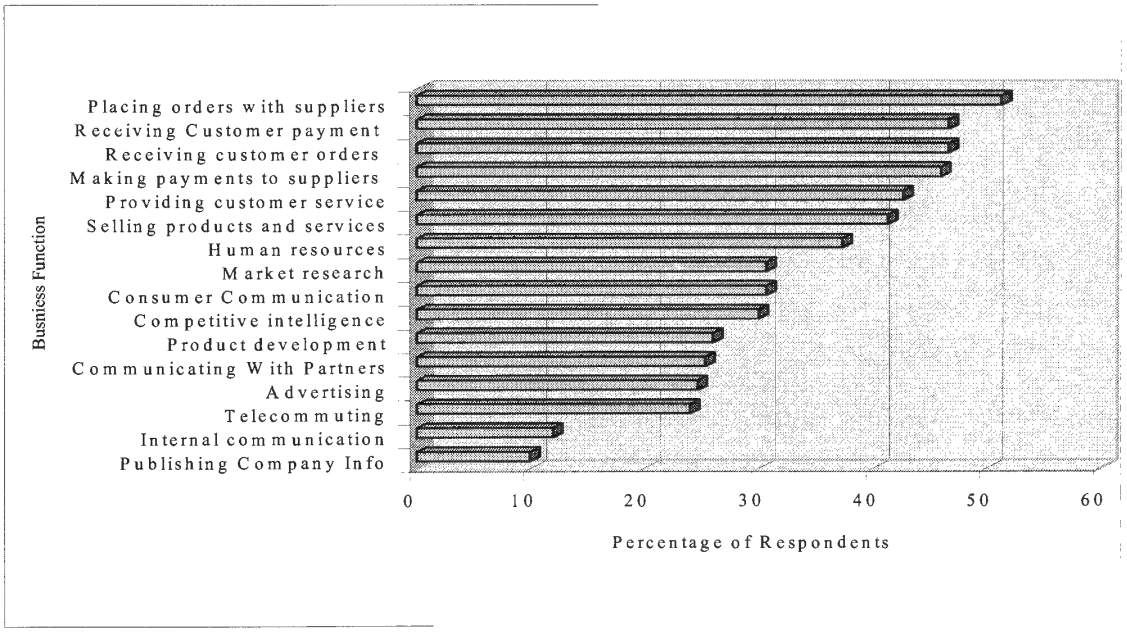
The planned implementations are significant across all business sizes (Appendix 7D, Table 7D.1. Fairly equal proportions of organizations in each size category (more than 30%) plan to implement back-to-back integrated applications and security technologies in the next three years. Again, business size does not appear to influence future eCommerce technologies uptake and the small and medium enterprises show as much interest towards eCommerce as their bigger counterparts.

Figure 7.4 Planned Implementation of eCommerce Technologies



In terms of planned business functions to be performed using Internet based networks, the emphasis appears to be on marketing and procurement related functions. 52% of the respondents expect to place orders over the Internet with their suppliers and 46% plan to make the payment through the same channel. 47% intend to receive orders and payment from customers. Moreover, 38% of the respondents expect to perform human resources functions.

Figure 7.5 Planned Electronically Performed Business Functions



The planned business functions to be performed electronically do not appear to show significant difference because of the size of the organizations (Appendix 7D, Table 7D.2). All the respondents in the small, medium and large business category indicate significant plans to place orders with suppliers (48%, 42% and 56% respectively). Respondents also indicate their tendency to receive customer orders and payment and provide customer service within the next three years: SMEs 46%, 41% and 37% respectively and large businesses 51%, 47% and 46% respectively. However, large businesses appear to show significant interest (43%) in terms of plans to conduct human resource activities through Internet based networks compared to SMEs (28%). This definitely reflects the importance of such a function for big businesses in contrast to their smaller counterparts

7.4. SUMMARY

This chapter has indicated that with current implementation levels and a further two years of planned activities, the overall picture of eCommerce in South Africa looks promising. The findings in terms of currently implemented technologies; business functions performed online and the eCommerce status reveal a consistent picture of the level and complexity of eCommerce penetration in South Africa. At present, communication and publishing technologies are the most widely implemented technologies. In a similar fashion, most of the respondents report to have been using these Internet based channels to enhance and support their communication internally among various departments and externally with customers, partners and the general public.

Implementation plans for eCommerce technologies in the next two years revolve around extending communication technologies and those enabling supply chain particularly marketing and procurement activities. The finding in terms of the planned business functions to be performed electronically provides further evidence to this. Moreover, the planned technologies and electronically performed business functions are consistent with the intended eCommerce status of the respondents within the same time frame.

Respondents to the survey represent a wide range of sectors, although the majority of them were from the non-electronics manufacturing and financial services sectors. Attempts were made to highlight the sector-wise distribution of currently implemented technologies, electronically performed business functions and the eCommerce status of the organizations. The result reveals that while the manufacturing sector appears to lead in terms of the current

implementation of eCommerce technologies, when the percentages of implementations were evaluated within each sector, all of the sectors appear to show more or less the same trend and a leading sector does not appear to emerge. This finding can be used as a benchmark for comparing future studies but its interpretation must make due allowances to the sampling technique used and to the number of respondents in each sector. Any generalization from this study to the sector-wise eCommerce uptake needs to be done cautiously.

The survey covered a fair distribution of small, medium and large businesses. An interesting finding in this connection is that the business size does not seem to significantly affect the current levels of implementations of eCommerce technologies, business functions and maturity status and their planned uptake. Small and medium enterprises appear to be keeping up with their bigger counterparts in all of the comparisons. This provides preliminary support to the argument that was made earlier in the literature review that the conventional wisdom of IT adoption that establishes a positive relationship between business size and adoption might need to be investigated when it comes to eCommerce.

The discussion made in this chapter sets the context within which the research hypotheses are to be tested and evaluated. In addition, the finding might provide possible explanations for the results of the hypotheses tests. For example, the literature review argued that there could be a potential positive correlation between eCommerce maturity and the nature of eCommerce benefits attained. The findings discussed in this chapter in terms of the current status of eCommerce maturity will then help to inform any interpretation of the test results of eReadiness and eCommerce benefits.

In summary, the survey indicates that eCommerce appears to have infiltrated the business world in South Africa. Beyond all the current activities also lies an optimistic future that cuts across sectors and business sizes in terms of planned implementations. Questions of interest are then what factors contribute to the adoption and implementation of eCommerce; whether or not the businesses are getting benefits from their eCommerce investments and what possible factors affect those achievements? This research argued that the differentiating factor in determining whether the businesses taking the plunge are actually achieving benefits from their eCommerce engagements, is whether or not these businesses migrated to eCommerce because of the hype, or whether they took a more considered approach. This will be what the next chapter attempts to explore by way of testing the various research hypotheses.

CHAPTER EIGHT

FINDINGS AND ANALYSES III: HYPOTHESES TESTING

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CHAPTER EIGHT

FINDINGS AND ANALYSIS III: HYPOTHESES TESTING

I found Rome a city of bricks and left it a city of marble (Augustus Caesar). Rome was not built in a day. If it were, we would've hired their contractor (In Treese and Stewart, 1998).

8.1 INTRODUCTION

This study hypothesized that eReadiness explains a significant part of the variation in eCommerce success. To that effect, a theoretically grounded model was proposed and discussed in the earlier chapters. Following the instrument validation process, the model was further refined and its constructs defined.

This chapter describes the operationalization of the research model and the hypotheses tests. However, prior to any statistical analysis, the data is tested for normality and the extent of multicollinearity. Furthermore, a descriptive analysis of the data in terms of eReadiness and eCommerce success profiles is conducted. This analysis is extended to identify the potential impact of business size and sector on the eReadiness and eCommerce success profiles of the businesses. The profile analyses reveal relationships among the research constructs that warrant more sophisticated statistical analyses.

To explore the eReadiness factors that affect the dependent variables representing eCommerce success, the research model is segmented into two sub-models: one for the success of eCommerce adoption and another for the successes of eCommerce development and benefits. This is needed because of (1) the variation in the scales used to operationalize eCommerce adoption (categorical) and the other facets of eCommerce success (quasi-interval) and (2) the other facets of success are tested only for those organizations that have adopted eCommerce and mixing the two is not found to be appropriate. The models are then individually tested and the findings discussed. Finally, a summary is provided and conclusions drawn.

8.2 DATA TEST

The research model and the hypotheses are analyzed using statistical techniques from the Multivariate data analysis family. Two assumptions about the data have to be verified before such an analysis technique is to be employed. These are normality and multicollinearity.

However, there is also evidence that some Multivariate data analysis techniques, such as discriminant function analysis, are not very sensitive to violations of normality assumptions (Hair et al, 1979:87). Normality refers to the distribution of the sample data with respect to a measure of centroid (mostly mean) for each of the research variables. Multicollinearity, on the other hand, refers to the degree of relationship between two independent variables that are used to predict a criterion variable.

8.2.1 Assessing Normality

The distribution of many test statistics is normal or follows some form that can be derived from a normal distribution. Thus, it is essential to demonstrate that this assumption is not seriously violated. A variety of techniques for testing normality are available. The most common one is the visual examination of the distribution of the data through a histogram with superimposed normal curve. Other tests include the study of the kurtosis and skewness values of the data. Skewness measures the deviation of the data from the symmetry. Normal distributions are perfectly symmetrical, that is, the skewness values are closer to zero. Kurtosis on the other hand reflects the peakedness of the distribution. The kurtosis of a normal distribution is zero. More precise information can also be obtained by performing one of the tests of normality such as Shapiro-Wilk's W test. Appendix 8A provides the histograms with superimposed normal curve for each of the research variables and Table 8.1 summarizes the other tests for normality.

Table 8.1 Summary for Normality Test

	Valid n	Mean	Std. Dev	Skewness	Kurtosis	W	*p*
Awareness	150	2.26	0.728	0.219	-0.428	0.968	0.488
Human Resources	150	2.46	0.879	0.256	-0.360	0.967	0.421
Business Resources	150	2.82	0.736	-0.007	-0.229	0.947	0.026
Technology Resources	150	2.39	0.856	0.162	0.520	0.961	0.387
Commitment	150	2.55	0.824	0.108	-0.327	0.987	0.612
Governance	92	2.81	0.714	0.201	0.096	0.985	0.501
Government eR.	150	3.50	0.725	0.027	-0.371	0.945	0.032
Market forces eR.	150	3.20	0.813	0.068	-0.208	0.979	0.248
Supporting industries eR.	150	2.81	0.700	0.217	-0.174	0.981	0.307
Success of development	92	3.04	0.968	0.026	-0.592	0.947	0.032
Communication Improvement	92	2.20	0.905	0.772	0.797	0.906	0.003
Market place benefits	92	2.80	0.837	0.372	0.100	0.975	0.127
Cost saving benefits	92	3.34	0.856	-0.069	-0.208	0.949	0.046
Satisfaction with eCommerce performance	92	2.95	0.925	0.117	-0.602	0.897	0.001

Examination of table 8.1 and the histograms in Appendix 8A indicates that overall the normality assumption can reasonably be accepted. However, independent variables such as communication improvement, overall satisfaction with eCommerce and cost savings show skewness indicating the extent of the realization of these benefits, as will be explained below.

8.2.2 Assessing Multicollinearity

Multicollinearity refers to the strength of correlation between two independent variables. Multicollinearity is a serious problem if two independent variables are perfectly correlated. To determine the extent of multicollinearity in the research model, the Pearson Correlation Matrix is examined (Table 8.2). According to Hair et al (1995), multicollinearity problems will be serious if the squared correlation among the independent variables is close to 0.80. The highest squared correlation among the independent variables in Table 8.2 is 0.425, which is between the aggregated measures of governance and commitment. None of the other squared correlations are close to 0.80 to suggest a multicollinearity problem. In general, there does not appear to be any evidence of a significant multicollinearity problem among the research variables.

Table 8.2 Correlation Matrix of the Research Variables

	1	2	3	4	5	6	7	8	9
1. Awareness	1								
2. Human Resources	0.33	1							
3. Business Resources	0.38	0.48	1						
4. Tech. Resources	0.43	0.34	0.41	1					
5. Commitment	0.53	0.39	0.53	0.48	1				
6. Governance	0.38	0.06	0.44	0.35	0.65	1			
7. Government eR	0.01	0.10	0.08	0.13	0.13	0.13	1		
8. Market Forces eR	0.35	0.24	0.37	0.21	0.38	0.38	0.23	1	
9. Support Industries eR	0.06	0.08	0.14	0.17	0.17	0.17	0.39	0.35	1

8.3 eREADINESS AND eCOMMERCE SUCCESS[1] PROFILE ANALYSIS

This thesis argues that eReadiness and eCommerce success are not questions that could be addressed on a dichotomous scale. Rather each business demonstrates a certain profile of eReadiness and eCommerce success. While some might show an overall strong profile, others

[1] The term eCommerce success in this section refers to the success of development and benefits.

might demonstrate a relatively weak profile. In this section, the eReadiness and eCommerce success profiles of the businesses are constructed and compared. In addition, the impact of ecological variables such as business size and sector on the eReadiness and eCommerce success profiles are examined. Where applicable, ANOVA tests are used to test the significance of the observed patterns.

8.3.1 eReadiness and eCommerce Success Profile

A cluster analysis technique is used to construct the profiles. Cluster analysis is normally used to organize observed data into meaningful structures and develop taxonomies. Therefore, it is an appropriate technique to construct the eReadiness and eCommerce success profiles. Based on the K-means clustering algorithm, five clusters are produced (*Between SS 146; Within SS 26; F 169.88).*

The appropriateness of the classification is tested by comparing the within-cluster variability (Within SS) with the between-cluster variability (Between SS). Generally, a classification is considered as "good", if the Within SS is small while the Between SS is large". The classification produced here can therefore be accepted as "good" and it is also statistically significant (*p=0.000)*

The members of each of the five clusters are crosschecked with the original data and there is a 100% match between the members of each cluster and their observed current eCommerce status (alias eCommerce maturity[2]), that is, members of each cluster also share the same level of eCommerce status. This indicates that the clusters are not the artifacts of the research but rather reflect the observed data. Figures 8.1, 8.2 and 8.3 show the organizational eReadiness (alias internal eReadiness), external eReadiness (alias environmental eReadiness) and the eCommerce success (excluding adoption) profiles of each of the five clusters respectively, appendix 8B provides the mean scores.

[2] The maturity status is also used to operationalize eCommerce adoption.

Figure 8.1 Organizational eReadiness Profile

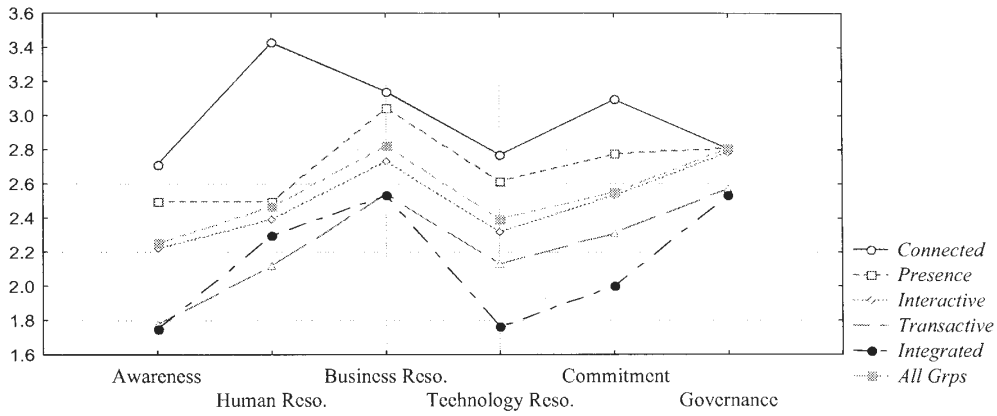


Figure 8.2 External eReadiness Profile

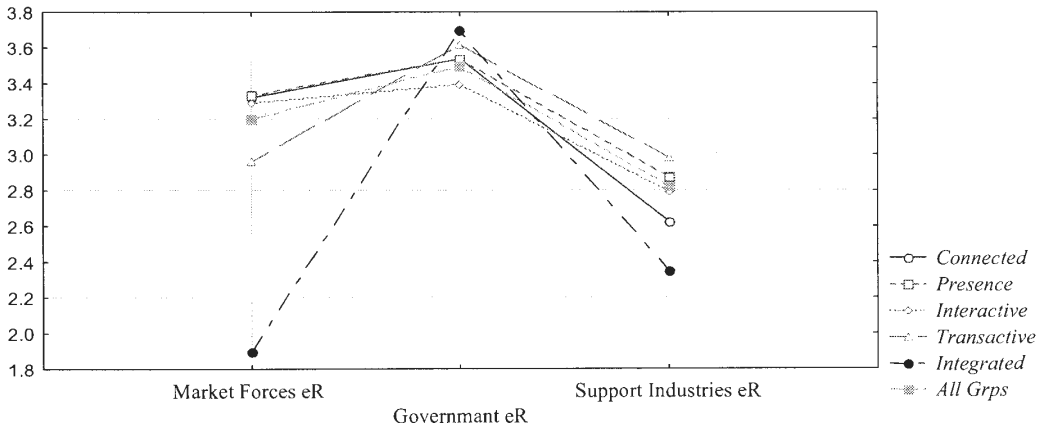
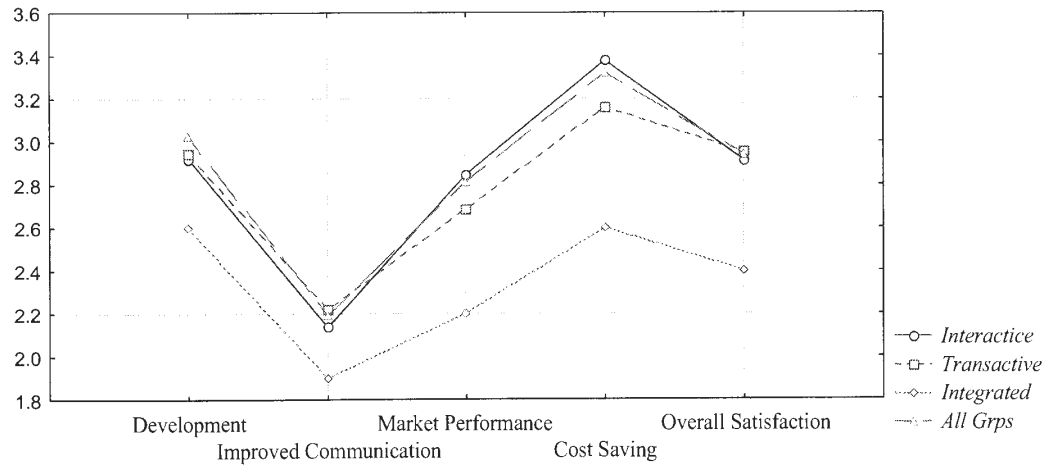


Figure 8.3 eCommerce Success Profile



Examination of figures 8.1, 8.2, and 8.3 reveals that, in general, there appears to be a direct match among the eCommerce status of the organizations, their organizational eReadiness, eCommerce success and external eReadiness.

Organizations that demonstrate a relatively better profile of eReadiness (both organizational and external) have achieved either a transactive or integrated eCommerce status and also reported to have obtained better benefits from their eCommerce engagements. The significance of this observation is further tested through ANOVA using the composite scores of organizational and external eReadiness as predictors and current eCommerce status as a dependent variable. The result produces a statistically significant model ($R2^3$ *=0.178, SS =24.478, MS= 3.497, df*=7, *F =4.399, p =0.0001)* indicating that eCommerce eReadiness explains a significant portion of the variation in eCommerce status. A further test of significance reveals that organizational eReadiness *(Current effect: F(3,142)=8.7818, p=0.00002)* is a significant predictor of the observed differences in eCommerce status.

The profile charts also indicate a uniform pattern among the five clusters in terms of organizational eReadiness. That is, while organizations in each cluster appear to have a better profile of awareness and possess (have access to) technological resources, they appear to demonstrate lower business resources and lack of governance models to manage their eCommerce activities. The Organizational eReadiness profile chart also indicates a clear distinction in terms of the preparation of the organizations across all six dimensions and their respective eCommerce status such that organizations that demonstrate weak organizational eReadiness profile are at the lower stages of eCommerce maturity compared to those with a relatively strong profile of organizational eReadiness.

In terms of the assessment of external eReadiness, interesting patterns have emerged. Businesses whose market forces and supporting industries demonstrate better eReadiness appear to be engaging in more sophisticated eCommerce activities than is the case otherwise. The Multifactor ANOVA test with the three variables of external eReadiness as predictors and eCommerce status as a dependent variable indicates that the difference in the market forces eReadiness (Current effect: *F(4, 135)=3.0350, p=.01964)* appears to significantly affect the difference in eCommerce status. Overall, across all clusters, the government's eReadiness

[3] lower numerical scores represent superior ratings

received the lowest assessment. Comparison of the Organizational and external eReadiness profile charts (and the mean scores in appendix 8b) shows that businesses generally rate the external eReadiness lower than organizational eReadiness (see also appendix 8b).

The eCommerce success profile demonstrates a pattern such that businesses with a relatively better profile of eReadiness demonstrate a correspondingly better profile of success. The Multifactor ANOVA test using the composite scores of the organizational and external eReadiness on the success profile of the organizations results in a statistically significant model (*with Wilks lambda=0.630469, F(15, 188.12)=2.2809, p=.0055*) for the impact of the organizational eReadiness profile on the success profile of the businesses. In particular, the effect is significant on the development (*R2 =0.139, SS =10.27, MS= 2.055, df*=5, *F =2.318, p =0.050*) and market place benefits successes (*R2 =0.194, SS =10.146, MS=2.029, df*=5, *F =3.477, p =0.007*).

Current eCommerce benefits, however, are largely contained to improvements to internal and external communications followed by some gains in the market performance. The businesses do not seem to have obtained cost savings as a result of their eCommerce engagements. Considering the nature of eCommerce technologies and the business functions performed electronically (Chapter 7) this should be neither surprising nor discouraging. Nevertheless, the profile of eCommerce success tallies with the electronically performed business functions (Section 7.3.2, Chapter 7) where the majority of the organizations have reported to be using Internet based networks to conduct communications internally (79%) and externally with customers (57%) and partners (57%). In addition, the businesses evaluate that the delivery of their eCommerce projects is not on time and within budget. Overall, while those up the maturity ladder appear to be relatively fairly satisfied with the performance of their eCommerce, those down the ladder appear to show some degree of dissatisfaction.

The impact of eCommerce maturity on eCommerce success is tested through ANOVA. The result indicates that eCommerce maturity appears to have some impact on the success of eCommerce development (*R2 =0.116, SS =8.578, MS= 2.859, df*=5, *F =3.22, P =0.027*) and cost saving advantages (*R2 =0.101, SS =5.35, MS= 1.782, df*=3, *F =2.766, P =0.047*).

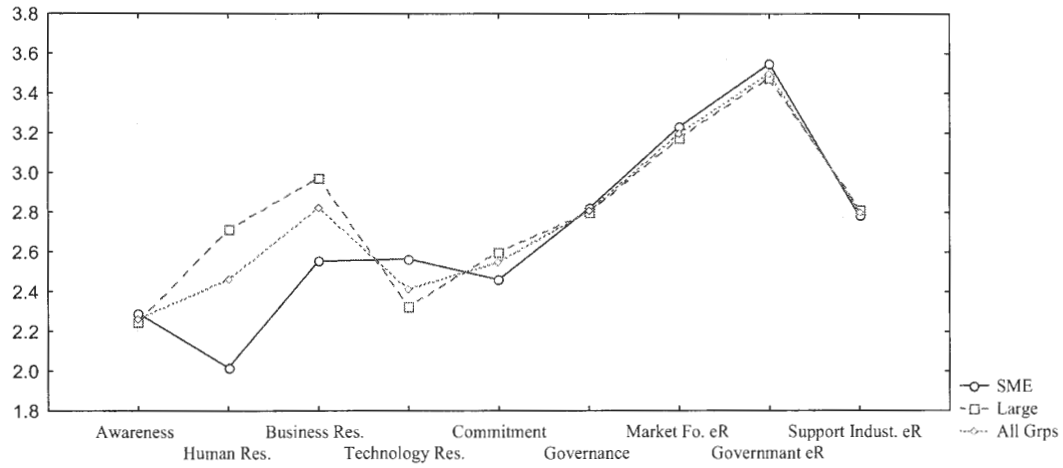
In general, the analysis hitherto outlines that the eReadiness profile has some influence on the eCommerce maturity and success profiles of the organizations. This assertion provides the

basis for using more powerful statistical tests in order to identify the variables of eReadiness that affect various facets of eCommerce success. However, before proceeding to that analysis, the following few pages provide the impact of ecological factors such as business size and sector on the eReadiness and eCommerce success profiles of the organizations.

8.3.2 Impact of Business Size on eReadiness and eCommerce Success Profiles

In order to assess if business size (expressed through full time equivalent staff (FTES)-Chapter 7) has an impact on the eReadiness profile of the businesses, the eReadiness profile of the businesses by size is plotted (Figure 8.4). Examination of Figure 8.4 (and the mean score values in appendix 8b.4) indicates a more or less similar pattern of eReadiness profile across business sizes.

Figure 8.4 eReadiness Profile of Businesses by Size

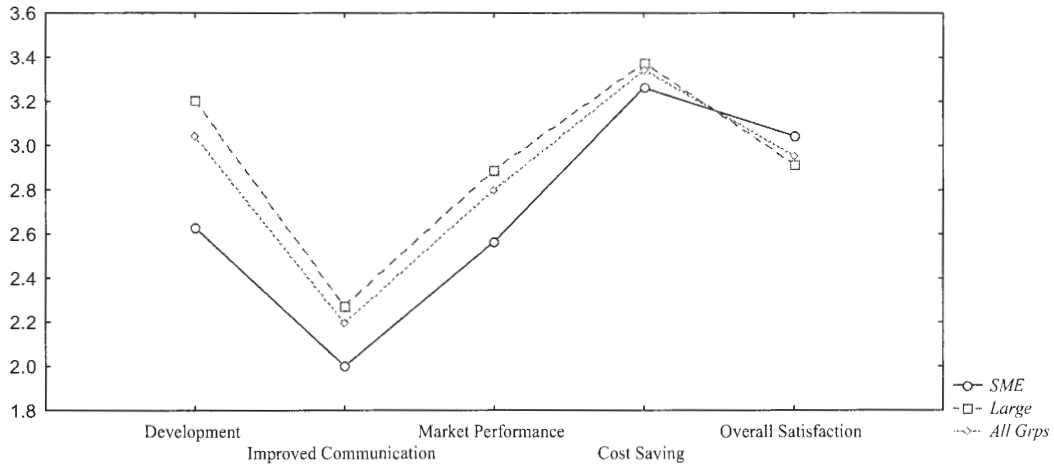


A one-way ANOVA with size as an independent predictor over the eReadiness variables appears to indicate a statistically significant difference on the eReadiness profile of the businesses because of size (*Wilks lambda=0.78773, F(9,72)=2.1557, p=.03532).* A further analysis to identify the eReadiness variables that appear to be sensitive to business size points to the human (*between Group SS = 6.35, F =5.4, p=0.022*) and business (*between Group SS = 3.77, F =7.3, p=0.008*) resources as being sensitive. Inspection of the eReadiness profile and the mean values indicates that in both cases, small and medium enterprises appear to show a relatively better profile of human and business resources. Considering the measures that operationalize these two variables (Appendix 6A), this shouldn't be surprising. Because of their size, small businesses can have the wherewithal to give access to computers and the

Internet to most of their employees and also their size might allow them to be flexible to changes, as they tend to be less bureaucratic. After removing the effects of the human resources variable, the ANOVA test was repeated and the result with *Wilks lambda=0.83650, F(7, 74)=2.0663, p=.05784* indicates no statistically significant impact of size on the eReadiness profile of the organizations. Therefore, it can be concluded that, overall, both small and medium and large businesses demonstrate a comparable profile of eReadiness when controlling for human resources variables.

The eCommerce success profile of the Small and Medium and Large enterprises (Figure 8.5 and appendix 8B.5) indicates that the SMEs report a slightly better achievement from their eCommerce endeavors compared to their larger counterparts. The ANOVA test (*Wilks lambda=0.87620, F(5, 76)=2.1476, p=.06875)* however shows no statistically significant impact of size on the eCommerce success profile of the businesses. However, size seems to have some impact on the success of eCommerce projects delivery, that is success of development (*between Group SS = 5.43, F =6.14, p=0.002*), such that SMEs have reported a relatively within-budget and within-time execution of eCommerce developments. This result however has to be interpreted with due consideration to the unequal distribution of the businesses sampled in the two groups.

Figure 8.5 eCommerce Success Profile By size



8.3.3 Impact of Sector on eReadiness and eCommerce Success Profiles

In addition to size, the impact of sector on the eReadiness and eCommerce success profiles of the organizations is assessed (Figures 8.6 and 8.7; see also appendix 8B.6 and 8B.7 for the

mean scores). The agriculture, retail and wholesale sectors appear to demonstrate a relatively lower profile of eReadiness, but tourism, manufacturing, electronics and computing show better profile. Nevertheless, the ANOVA test for the impact of sector on eReadiness reveals no statistically significant impact of sector on eReadiness *(Wilks lambda=0.27350, F(90, 437.55)=1.0241, p=0.42798).*

In terms of the impact of sector on the eCommerce success profile there does not appear to be a unique pattern related to the sector of the businesses (Figure 8.7). The ANOVA test indicates no significant impact of business sector on the eCommerce success profile of businesses (*Wilks lambda=.49515, F(50, 308.93)=1.0295, p=.42576)* .

Figure 8.6 eReadiness Profile by Sector

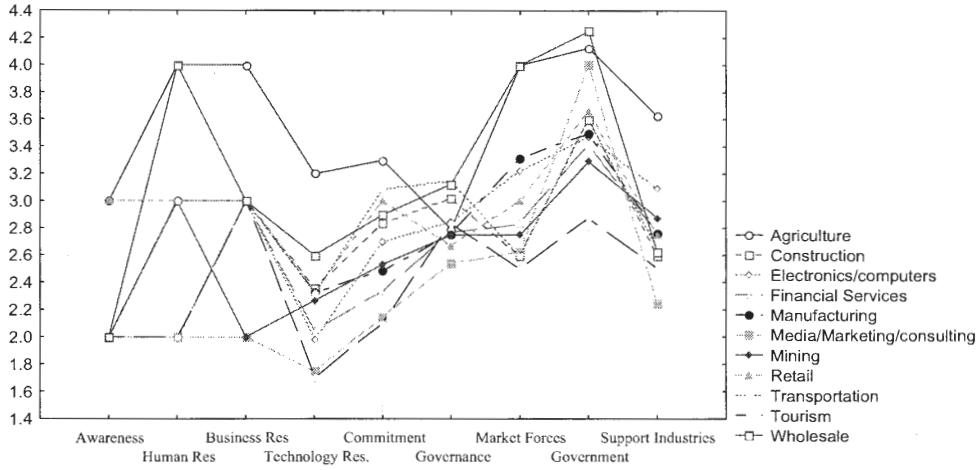


Figure 8.7 eCommerce Success Profile by Sector

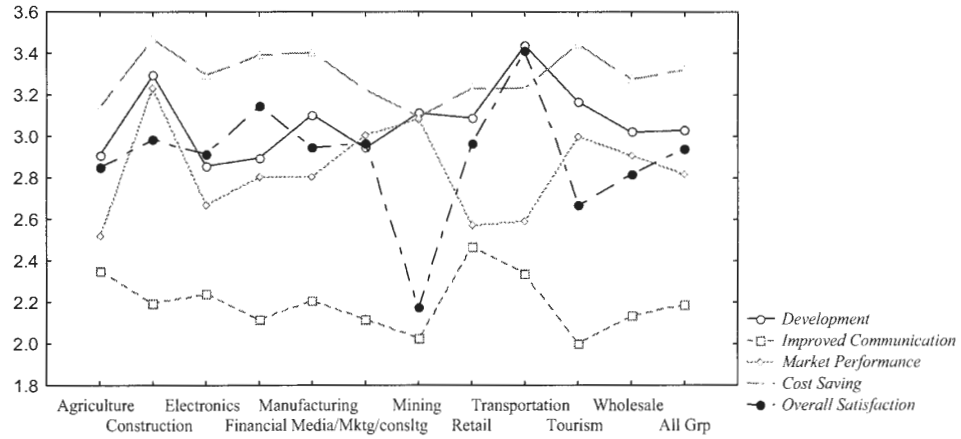


Table 8.3 summarizes the ANOVA test results discussed in the preceding sections.

Table 8.3 Summary of ANOVA Tests

Predictor	Dependent variable	Wilks Lambda	R^2	SS	DF	F	P
eReadiness (composite scores for organizational and external eReadiness)	eCommerce Status (Maturity)		0.18	24.48	7	4.399	0.001
eReadiness	eCommerce Success	0.63			15	2.281	0.006
eCommerce Maturity	Success of Development		0.12	8.58	5	3.222	0.027
eCommerce Maturity	Cost Savings		0.10	5.35	3	2.766	0.047
Size	eReadiness	0.78			9	2.170	0.035
Size	eReadiness w/o human resources	0.83			8	2.070	0.057
Size	eCommerce Success	0.87			5	2.150	0.069
Size	Success of Development			5.43		6.140	0.002
Sector	eReadiness	0.27			90	1.024	0.428
Sector	eCommerce Success	0.49			50	1.029	0.426

8.3.4 Discussion

This study identified nine key variables, classified into two constructs- organizational and external eReadiness- that are hypothesized to explain an organization's ability to succeed in eCommerce (adopt, develop and benefit). Taken together the nine attributes underpin the concept this study calls eReadiness. The study also defined three key facets of eCommerce success: adoption, success of development and success of benefits. Taken together these three facets underpin the concept of eCommerce success. Different organizations might demonstrate different combinations of the nine attributes of eReadiness and the three facets of eCommerce Success. These define their eReadiness and eCommerce success profiles respectively.

To the best of the author's knowledge, there is neither a best-of-breed database nor industry and/or country best practice to compare the eReadiness and eCommerce success profiles of the sampled organizations. As a result, a cluster analysis was used to organize the data into meaningful structures. The cluster analysis identified five clusters with a perfect match to the current eCommerce maturity status (connected, presence, interactive, transactive and integrated) of the sampled organizations. The eCommerce maturity status (alias eCommerce status, eCommerce maturity) reflects the degree to which the sampled organizations' business processes and functions are conducted or mediated electronically or the degree to which eCommerce adoption is institutionalized. In other words, it shows how far along the path of eCommerce the organizations progressed.

Results of the profile analysis demonstrate that while most of the sampled organizations appear to have a better understanding of the opportunities, perils, benefits, and impacts of eCommerce and closely monitor the eCommerce initiatives of their competitors and partners, they do not appear to have developed an organizational structure with clear roles, responsibilities, accountabilities as well as the authority to manage eCommerce activities and resultant change issues. The relatively better profile of awareness can be expected to lead to advantages in entry-level eCommerce adoption (McKay et al, 2001; Akkeren and Cavaye, 1999; Tan et al, 1999). Nonetheless, the profile of a weak governance model might affect how fast and how far an organization can successfully progress towards matured eCommerce (or institutionalize eCommerce) (Agrawal et al, 2000; Heijden, 2000). Another observation is that whilst the surveyed organizations reveal strong profile in terms of technological resources (such as connectivity, interactivity and flexibility) they tend to be cautious in their approach to eCommerce, perhaps preferring a wait- and-see approach (April and Cradock, 2000) and lack the degree of openness and aggressiveness that most in the eCommerce literature recommend (Eze and Seong, 2001; Tabor, 2000). The relatively weak business resources profile attests to this and might form part of the explanations to the limited nature of the business functions performed electronically as discussed in Chapter 7.

In terms of the external eReadiness, South Africa's relatively affluent IT and financial industries (Molla, 2000a; Kahn and Swanborough, 1999; see also Appendix I) appear to have a bearing on the better assessment the eReadiness of the supporting industries received compared to the rest. This might also provide part of the explanation for the good technological resources profile the organizations demonstrate. On the other hand, contrary to visible government initiatives such as the eCommerce discussion, white and green papers, infocom 2020, etc (Appendix I), the legal and regulatory frameworks and the government's commitment receive the least rating of all the external eReadiness attributes. One would expect this to affect materially the eCommerce activities of the organizations (Oxley and Bernard, 2001). A somewhat surprising finding related to the government's eReadiness is that it is ranked the least by respondents with eCommerce status higher up in the maturity ladder. This is the only exception from the general trend. A possible explanation could be that legal and regulatory frameworks become more important as organizations embark on more sophisticated eCommerce operations and organizations where eCommerce is more institutionalized (higher eCommerce status) might have a different assessment compared to those at the lower stages.

Cost reduction (of information gathering, transaction) is touted to represent perhaps the most obvious and immediate benefit of eCommerce (Zwass, 1998; Wigand and Benjamin, 1995). However, the eCommerce success profile of the businesses indicates that relative to the other benefits and criteria of success, cost saving is the least achieved. This finding is consistent with the findings of Chappell and Feindt (1999) and the NNI (1999). One explanation lies perhaps with the current eCommerce maturity level of the organizations suggesting that such benefits might not appear with entry-level eCommerce activities (NNI, 1999). Whilst financial gains (in the form of cost savings) appear to be hardly forthcoming, the improvements in communication are nevertheless crucial to the long-term success of the organizations (OECD, 1998).

Analyzing the importance and significance of each of the eReadiness variables on eCommerce success is what we will be discussing in the next two sections when the research model and the hypotheses are formally tested. However, from the profile analysis, it is possible to make some preliminary conclusions and interpretations that will be tested in the next two sections.

As businesses rush to capitalize on eCommerce, many often skip the wisdom of the old adage "know thyself". While meeting short-term needs, this approach has failed to deliver the benefits expected from eCommerce activities (Morath, 2000). Results of the profile analysis indicate that businesses that demonstrate a relatively better profile of eReadiness have progressed well on the eCommerce maturity continuum and have a relatively better profile of eCommerce success. In particular, the difference in eReadiness profiles is materially significant between businesses that are in the *connectivity* stage of eCommerce maturity and those up in the *integrated* stage. This finding provides preliminary empirical evidence to the conjecture that there could be predictors to eCommerce success.

Further, the literature argues that small and entry-level eCommerce activities (and investments) are not enough for organizations to succeed in eCommerce (Young and Benamati, 2000; NNI, 1999; Poon and Swatman, 1999). The findings of this study appear to provide credence to this argument in that a relatively better profile of eCommerce success is reported by businesses up in the eCommerce maturity ladder. Therefore, it may not be surprising that benefits from implementation of eCommerce may not occur immediately or even in the short term (NNI, 1999).

The profile analysis also suggests possibilities of significant early and fast mover advantages stemming from fast-track developments in eCommerce, perhaps to the extent of creating "winner-takes-all" outcome in eCommerce benefits. In so much as the eCommerce success profile and eCommerce maturity of the organizations are related to eReadiness, this will give businesses with better overall internal and external eReadiness a competitive advantage. Persaud (in the *Economist,* 2000) cautions that early mover advantage in eCommerce might have a "freezing" effect on the late entrants. Of course this will materialize only if the first mover advantages outweigh first mover disadvantages (Dos Santos and Peffers, 1998).

A number of e-commerce maturity models have been documented in the literature (Morath, 2000; McKay et al, 2000; IBM, 2000; Deise et al, 2000; NNI, 1999; APEC, 1999). Nonetheless, the literature does not appear to go beyond indicating the paths organizations walk through as they embark on eCommerce and identify the predictors and impacts of the maturity stages. The profile analysis demonstrates that while the eReadiness profile affects the eCommerce status, the eCommerce maturity stage in turn has a significant impact on the eCommerce success profile of organizations. Therefore, this finding validates, albeit preliminarily, the maturity model both downstream and upstream and opens an exciting arena for future research.

Recent research highlights the impact of "network externality" in the adoption of eCommerce (Grewal et al, 2001; Au and Robert, 2001; Bailey et al, 1995). The analysis, here, provides some support to this, as businesses up in the maturity ladder appear to have a materially different assessment of the market forces eReadiness.

An interesting finding, albeit one that is outside the scope of this thesis, is the lack of materially significant variation of eReadiness and eCommerce success profiles because of differences in business size and sector. While some (Eze and Seong, 2001; Mckay et al, 2000; Van Akkeren and Cavaye,1999) argue that small businesses and businesses in non-electronic sectors might lack eReadiness and tend to come lower on the maturity stage, the data here does not support such conjectures. This suggests an exciting direction for future theoretical and empirical research, that is, examining the conditions under which business size and sector play important roles in affecting eReadiness, eCommerce maturity and eCommerce success.

Overall, the above discussion shows a number of preliminary relationships. In general, there is a direct match among eReadiness, current eCommerce status and eCommerce success profiles. With this background, the following two sections test the hypotheses and discuss the results.

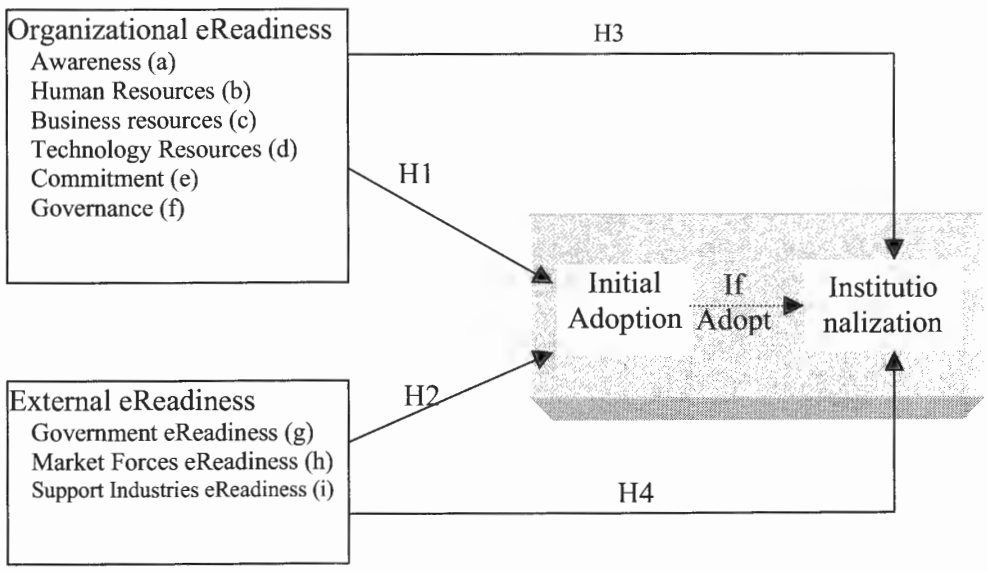
8.4 eREADINESS AND eCOMMERCE ADOPTION

Exploring the relationship between factors of eReadiness and eCommerce adoption requires addressing two related but distinct questions: (1) what variables of eReadiness determine the decision of businesses in developing countries to adopt eCommerce and (2) if the initial decision to adopt eCommerce is taken, then what variables determine maturity of eCommerce adoption. The first question is concerned whether an organization has taken the initial step to adopt eCommerce while the second question is concerned with the level of maturity of eCommerce adoption.

8.4.1 Model and Hypotheses Specification

Figure 8.7 depicts the reconstructed research model for eCommerce adoption as a dependent variable as one of the facets of eCommerce success. As can be seen from the model, the governance variable from the organizational eReadiness construct will not be tested with initial adoption. This is because governance issues become apparent once an organization has decided to take the first step to adopt eCommerce and not before.

Figure 8.7 A model of eCommerce Adoption for Businesses in Developing Countries



The dependent variable is eCommerce adoption. As explained in chapter four, there are two measures for this dependent variable. The first measure, initial adoption was operationalized as a dichotomy, that is whether the businesses adopt eCommerce or not. For the purposes of this research, an organization is considered to have adopted eCommerce if it has achieved an interactive status on the six-stage eCommerce maturity model (refer to chapter four for explanation). The second measure of eCommerce adoption, degree of institutionalization of eCommerce, was operationalized through the eCommerce maturity status, namely interactive, transactive or integrated. Table 8.4 lists the research hypotheses.

Table 8.4 Hypotheses for eCommerce Adoption

Hypothesis ID	Description
H1a	Awareness contributes significantly (and is positively related) to initial adoption of eCommerce
H1b	Human resources contribute significantly (and is positively related) to initial adoption of eCommerce
H1c	Business resources contribute significantly (and is positively related) to initial adoption of eCommerce
H1d	Technological resources contribute significantly (and is positively related) to initial adoption of eCommerce
H1e	Commitment contributes significantly (and is positively related) to initial adoption of eCommerce
H2g	Government eReadiness contributes significantly (and is positively related) to initial adoption of eCommerce
H2h	Market forces eReadiness contributes significantly (and is positively related) to initial adoption of eCommerce
H2i	Support industries eReadiness contributes significantly (and is positively related) to initial adoption of eCommerce
H3a	Awareness contributes significantly (and is positively related) to the maturity of eCommerce adoption
H3b	Human resources contribute significantly (and is positively related) to the maturity of eCommerce adoption
H3c	Business resources contribute significantly (and is positively related) to the maturity of eCommerce adoption
H3d	Technological resources contribute significantly (and is positively related) to the maturity of eCommerce adoption
H3e	Commitment contributes significantly (and is positively related) to the maturity of eCommerce adoption
H3f	Governance contributes significantly (and is positively related) to the maturity of eCommerce adoption
H4g	Government eReadiness contributes significantly (and is positively related) to the maturity of eCommerce adoption
H4h	Market forces eReadiness contributes significantly (and is positively related) to the maturity of eCommerce adoption
H4i	Support industries eReadiness contributes significantly (and is positively related) to the maturity of eCommerce adoption

8.4.2 Initial Adoption

The individual hypotheses in relation to the initial eCommerce adoption are tested using multiple discriminant function analysis (MDFA). MDFA is a multivariate data analysis technique appropriate when the dependent variable is categorical (either dichotomous or multichotomous) and the independent is interval (Hair et al, 1979, 1995; Klecka, 1980). The technique allows deciphering differences between two or more a *priori* defined groups with respect to two or more independent variables simultaneously.

MDFA involves three sequential stages-*derivation, validation and interpretation* (Hair et al, 1995,1979). The derivation stage determines whether or not a model produces a statistically significant function to separate the two (or more) groups. The validation stage involves testing the predictive accuracy (or effectiveness) of the derived discriminant function. And lastly the interpretation stage identifies the independent variables that contribute the most towards discriminating between (among) the groups. The results of the discriminant analysis together with the descriptive statistics are presented in Table 8.5 and Appendix 8C while the correlation matrix is provided in Appendix 8B.

Table 8.5 Discriminant Analysis for the Initial Adoption of eCommerce

Variable	Discriminant Loading	F-value	P-level	Coefficient	Non Adopters (n=58)		Adopters (n= 92)	
					Mean	Std dev	Mean	Std dev
Awareness	**0.402**	131	0.000	0.354	2.57	0.72	2.06	0.66
Human Resources	**0.832**	299	0.000	0.878	2.70	1.26	2.31	1.17
Business Resources	**0.469**	180	0.000	0.402	3.06	0.71	2.67	0.72
Technological Resources	**0.298**	105	0.000	0.267	2.69	1.01	2.24	0.77
Commitment	0.207	69	0.000	0.042	3.09	0.94	2.39	0.77
Government eR.	0.057	83	0.000	- 0.068	3.02	0.74	3.03	0.68
Market Forces eR.	**0.324**	120	0.000	0.274	3.04	0.79	2.91	0.83
Support Industries eR	0.0781	59	0.001	0.034	3.60	0.84	3.53	0.81
Wilks Lambda = 0.255		*df = 8*			*P= 0.000*			
Canonical R = 0.86		*$\chi 2$ =196.67*			*F=51.443*		*D^2=12*	

Percentage of Correct Classification 97%; Adopters: 100%; Non Adopters: 93%

The MDFA produces a statistically significant function *(Wilk's lambda= 0.255; Chi-Sqr = 196.67; df = 8; F= 51.443, p<0.0000)* indicating that the model is satisfactorily significant in discriminating adopters and non-adopters of eCommerce. The predictive accuracy (also known as classification accuracy) of the discriminant function (which is analogous to regression's r^2) is tested using the hit ratio of the classification matrix. The function correctly classifies (hit ratio) 97% of the businesses (93% of non adopters; 100% adopters) in the sample. This exceeds the hit ratio of 52.6% (using proportional chance criteria[4]) that would be expected due to chance.

Hair et al (1979) recommend that in order to accept the classification accuracy relative to chance, the classification accuracy (hit ratio) should exceed the chance accuracy by at least 25%. The 97% hit ratio is well beyond 25% of the chance accuracy (52.6%) indicating acceptable classification accuracy. Therefore, the model can be considered as a valid predictor of eCommerce adopters and non-adopters. A further indicator of the effectiveness of the model is the distance between the two groups called the *Mahalanobis Distance* (D^2). The D^2, which is equivalent to the f-test for statistical significance of the r^2, is 12. This is high enough to further support the validity of the function (Hair et al, 1979).

After validating the function, the next phase is *interpretation*. This involves examining the function to determine the relative importance of each of the independent variables in discriminating between the groups. Generally, there are three proposed methods: *discriminant weight, discriminant loadings and partial f-values* (Hair et al, 1979). Of the three, the loadings approach is the more valid and preferred method (Hair et al, 1979). The discriminant loadings (or structure correlations) show how closely a variable and the discriminant functions are related. It reflects the variance that the independent variables share with the discriminant function and can be used to assess the relative contribution of each independent variable to the discriminant function.

Generally, any variable exhibiting loadings greater than or equal to 0.30 is considered significant (Hair et al, 1995,1979). The probabilities for the *f* statistics can also identify the independent variables (discriminating variables) that are significant discriminators between eCommerce adopters and non-adopters. On the basis of the analysis, human resources,

[4] $C_{proportional}$= (proportion in group 1)^2 + (1- proportion in group 2)^2

business resources, awareness, market forces eReadiness, and technology resources are identified as significant (and positive, the signs of the loadings in Table 8.5) contributors to affecting initial eCommerce adoption.

The above result supports five of the eight hypotheses linking factors of eReadiness to initial eCommerce adoption, specifically H1a, H1b, H1c, H1d, H2h (Table 8.4). Therefore, initial eCommerce adoption (having an interactive eCommerce Status) is significantly influenced by factors of organizational eReadiness: awareness, human resources, business resources, technological resources and the market forces eReadiness from the external eReadiness category (Table 8.5).

8.4.3 Institutionalization of eCommerce (Adopters Only)

As explained in Chapter four, institutionalization of eCommerce (alias maturity of eCommerce adoption) is evaluated only for those organizations that satisfy the criteria set for eCommerce adoption, that is achieving interactive eCommerce status. Discriminant analysis is again used to test the individual hypotheses relating eReadiness factors to the institutionalization of eCommerce (a multichotomous dependent variable of interactive, transactive and integrated eCommerce status). The result is summarized in Table 8.6 (and Appendix 8C.4) and the correlation matrix is described in Appendix 8C.3.

The analysis produces a model that is satisfactorily significant in discriminating the various levels of eCommerce institutionalization, interactive, transactive and integrated (*Wilk's lambda= 0.111; $\chi 2$ = 177.76; df = 18; F= 17.07; p<0.0000*).

The function correctly classified 95% (classification accuracy) of the businesses in the sample (100% of interactive; 90% transactive and 92% of integrated). The 95% classification accuracy exceeds, by more than 25%, the hit ratio of 51.77% that would be expected due to chance. In addition, the Mahalanobis Distances (D^2) are materially high (Table 8.6): 11 between interactive and transactive (D^2_1); 17 between interactive and integrated (D^2_2) and 10 between transactive and integrated (D^2_3). Therefore, the model can be accepted as a valid predictor of the institutionalization of eCommerce Adoption.

Table 8.6 Summary of Discriminant Analysis for eCommerce Maturity

Variable	Discriminant Loading	F-value	P-level	Coefficient
Awareness	0.134	17	0.000	-0.071
Human Resources	-0.018	25	0.000	0.153
Business Resources	0.119	19	0.000	-0.185
Technological Resources	0.157	21	0.000	0.149
Commitment	**0.360**	69	0.000	0.366
Governance	**0.383**	36	0.000	0.630
Government	**0.471**	41	0.000	0.373
Market Forces	**0.846**	74	0.000	0.903
Supporting Industries	**0.488**	31	0.001	0.606
Wilks Lambda = 0.111		*df 18*		*P= 0.000*
Canonical R = 0.84		*$\chi 2$ = 177.76*		*F=17.078*

Percentage of Correct Classification 95% (100% of Interactive; 90% transactive and 92% Integrated)

D^2_1 =11 *D^2_2 = 17* *D^2_3=10*

The variables that contribute significantly to the discriminant function (discriminant power of the model) based on their discriminant loading values are, in descending order, market forces, supporting industries, government, governance, and commitment (Table 8.6). Therefore, it can be concluded that these variables allow discriminating the maturity of eCommerce adoption. The result supports the following hypotheses: H3e, H3f, H4g, H4h, H4i. It is interesting to note that the initial eCommerce adoption and the maturity of eCommerce adoption functions are weighed by slightly different sets of variables.

8.4.4 Discussion

A novel model of eCommerce adoption for organizations in developing countries is proposed and empirically tested. The findings indicate that the model is sufficiently valid in discriminating adopters from non-adopters and the degree of institutionalization of eCommerce (maturity levels of eCommerce adoption). In general the finding supports the interactionism perspective in that a mix of internal organizational and external environmental factors have been identified as significantly affecting eCommerce adoption. In this section, the findings of the study will be discussed in detail.

8.4.4.1 Initial adoption

The adoption of innovations new to an organizational setting (such as eCommerce) requires different human, business and technical resources than those needed to adopt "matured technologies" (Montealegre, 1999a; King et al, 1994). It has been argued that such positive organizational factors contribute to the success of technology diffusion (Bowonder et al , 1994).This is particularly challenging for developing countries, where these resources are materially lacking (Goldstein and O'Connor, 2000; Vreede et al, 1998; Montealegre, 1996; Munene, 1995; Austin, 1990). In addition, in contrast to the adoption of stand-alone IT innovations (such as personal computers), the adoption of more complex and sophisticated IT innovations that cut across organizational boundaries (such as eCommerce) cannot be adequately understood without an in-depth analysis of the external environment (Montealegre, 1999a; King et al, 1994; Orlikowski, 1993; Orlikowski, 1991).

The data analysis suggests that the resources dimensions of organizational eReadiness have major effects on the success of initial eCommerce adoption. Three essential resources complementary to eCommerce that affect initial eCommerce adoption are human, business and technology and those organizations that move adroitly to secure or develop these resources have appeared to adopt eCommerce. This observation is comparable to the findings of IT adoption in developing countries (Montealegre, 1999; Lambert, 1995) and emerging studies in eCommerce adoption (Mckay et al 2001; Tabor, 2000; Van Akkeren and Cavaye, 1999). In particular, it supports studies including Powell and Dent-Micallef (1997), Davenport (1994) and Powell (1992), in which human resource practices explained more performance variance than environmental factors. It also supports findings- Seyal et al, 2000; Montealegre, 1996; King et al, 1994; Kasongo (1991)- which outline human resources as one of the chief challenges in the effective utilization of IT in developing countries.

However, our finding is unique in the sense that while previous adoption studies investigated a limited repertoire of resources, perhaps this study is the first of its kind to investigate eCommerce adoption in a developing country using the resource taxonomies suggested in the resource-based theory. The finding is however consistent with the study done by Kwon and Zmud (1987) who commented that successful technology implementation occurs when organizational resources are positively supported for initial motivating and implementing efforts. Moreover, it also validates Swanson's (1994) hypothesis that initial adoption of innovation is most likely where the host organization possesses resources

Not surprisingly, eCommerce awareness is another major factor affecting initial adoption of eCommerce. This finding tallies with most of the existing adoption theories in general (Licker, 1997; Rogers, 1983; Zaltman et al, 1973) and challenges of eCommerce adoption in developing countries in particular (Bekele, 2000; Molla, 2000a; UNECA, 1999; Jensen, 1999; Kamel and Hussein, 1999). In this connection, while the literature on eCommerce in developing countries submits to the lack of awareness as one of the chief challenges affecting adoption of eCommerce, it usually falls short of identifying what eCommerce awareness actually represents. Using the interpretive lens of the Situational Awareness Theory (SAT), a theory much less known to the IS and eCommerce fields, we were able to conceptualize and investigate eCommerce awareness as distinct from the sources and processes of awareness (Endsley, 2000a; Endsley 2000b; Endsley et al , 2000) as a three dimensional construct, *perception, comprehension and projection.*

The finding, therefore, indicates that organizations which take good stock of the changes that are occurring in their environment as a result of eCommerce, comprehend the meanings of these changes to their business (opportunities, threats and potentials), and project how all these are going to affect their business in the short to long term are likely to take the first steps to move to eCommerce. This finding also supports the perceived benefit hypothesis that forms the kernel of most adoption theories and empirical studies (Gefen and Straub, 2000; Moore and Benbasat, 1991; Davis, 1989). Nonetheless, while most previous studies focused on the perception of an individual manager, our approach has been a little bit different from the established tradition in that we have used senior level managers as dispassionate observers ("expert-witnesses") to assess their organization. In addition, the use of SAT allowed us to look into other measures of awareness, such as for example those referring to comprehension and projection, that can be considered unique to this study and that might open a new avenue for future research.

Surprisingly, environmental determinants have little-to-moderate influence on respondents' initial eCommerce adoption. This is consistent with Thong's (1999) finding and perhaps contrary to the popular literature that emphasizes the forces of the external environment on the entry-level eCommerce adoption. Of all the external eReadiness factors, the market forces eReadiness is the only factor that appears to influence initial eCommerce adoption. To the extent that the organization's suppliers, customers and partners are ready to do business

electronically, they will facilitate the path to adoption. This finding gives credence to the theory of positive network externality (Sillince et al, 1999; Bailey et al, 1995). However, we caution the reader to reflect on the South African context before generalizing this to other countries. The relatively better position of South Africa in terms of IT and other support giving industries and the government's apparent commitment towards making South Africa an information savvy society might have influenced this result (See Appendix I). This however does not undermine the findings of the study here. Rather, what it does is to caution future research not to paint all developing countries with one brush and to consider the profound differences that exist even among the so-called developing countries (Abdullah, 1999; Austin, 1990).

Finally, the remaining organizational and external eReadiness variables (commitment, government readiness, support industries eReadiness) do not appear to have any significant effect on the initial adoption of eCommerce. Previous research (such as Scheepers, 1999; Wilson, 1999; Goldberg and Sifonis, 1998) indicated that some organizations have moved into eCommerce without management's conscious decision. This might explain why commitment did not turn out as a contributing factor for the initial eCommerce adoption. South Africa's relatively advanced status in IT and other support giving industries and the level of eCommerce adoption chosen as an initial eCommerce adoption and the kinds of institutional environment it requires might also explain the insignificant contribution of support industries and government readiness respectively. Therefore, additional research needs to be conducted before more concrete conclusions can be drawn.

8.4.4.2 Institutionalization of eCommerce

One of the acknowledged differences between managing in a less developed and in developed countries is that in developing countries the environment tends to be much more challenging and carries more significant managerial implications (Jarvenpaa and Leidner, 1998; Montealegre, 1994; Austin 1990). Institutional theory (Oxley and Yeung, 2001; Scott, 1995; King et al, 1994), organizational ecology theory (Robey and Zmud, 1992; Miller and Friesen, 1984) and competitiveness theory (Porter, 1990) suggest that organizational innovations are influenced by the environmental (social, economical, network ties, market forces, government, regulatory pressures, societal expectations) context within which organizations operate. Such impact of the external environment is more profound in developing countries (Abdullah, 1999; Jarvenpaa and Leidner, 1998; Morales-Gomez and Melesse, 1998; Munene, 1995).

The main result, here, appears to be consistent with the interactionism perspective and suggests that external eReadiness forces together with the commitment and governance factors (organizational eReadiness) have significant effects on the maturity of eCommerce adoption. This is an interesting finding and can lead us to the preliminary conclusion that the factors that affect initial eCommerce adoption are somewhat different from those that affect the level of institutionalization of eCommerce in an organization. This is consistent with research that suggests that factors facilitating innovation in its early phase could be the reverse of those facilitating the later phases (Swanson, 1994).

Market forces eReadiness emerged as the most significant factor affecting the level of maturity of eCommerce adoption (institutionalization of eCommerce). This reveals the importance of meso rather than macro variables in eCommerce adoption, as market forces tend to be relatively specific to a given sector and industry. This finding is again consistent with network externalities theory and is also in line with critical mass theory (Au and Kaufman, 2001; Bowonder et al, 1994; Kwon and Zmud, 1987). eCommerce exhibits network externalities-the more customers and partners adopt eCommerce the more an organization might be willing to adopt more sophisticated eCommerce.

The result reveals that organizations whose customers and other business partners are ready to conduct business electronically are those most likely to embark on matured eCommerce implementations, as they would expect value (network benefits) from such interactions (Au and Kaufman, 2001; Grewal et al, 2001; Sillince et al, 1999). Damsgaard (1996) refers to this as the "herd" effect in the decision to adopt a technology. The finding however is comparable with emerging studies of eCommerce adoption (Mckay et al, 2001; Cavaye and Akkeren, 1999) that highlight the effect of "external pressure" on eCommerce adoption, although in those studies external pressure is phrased more as a coercive influence whereas in the current study, market forces eReadiness was defined more as a positive (motivating) influence.

Supporting industries and government eReadiness are the other factors that emerge as discriminating among the three-interactive, transactive and integrated (the level of institutionalization of eCommerce). This finding provides empirical support to the work of Montealegre (1999a), who proposes, "in less developed countries, institutional intervention is essential in the adoption of IT innovations that cut across firm boundaries". It is also supported

by the existing literature on IT and eCommerce in developing countries (Akoh, 2001; Ghada, 2001;Montealegre, 1999a; Kamel and Hussein, 1999; Adam, 1996) that emphasize the role of government in facilitating IT and eCommerce diffusion. In addition, it is consistent with organizational science theory that emphasizes the role of perceived environment (Jarvenpaa and Ives, 1990; Miller and Friesen, 1984) and the organizational ecology model, which stresses the forces of 'external controls' on the preferences and decisions of an organization (Robey and Zmud, 1992).

Another interesting finding here is also that, once organizations move into adopting interactive eCommerce systems, the commitment of managers, especially those in the top and others throughout the organization appear to drive how far and how fast an organization moves up the maturity ladder of eCommerce. Many researchers have found lack of commitment, especially from top executives, as one of the chief obstacles affecting IT implementations (Powell and Dent-Micallef, 1997; Collis and Montgomery, 1997). The same problem is echoed in eCommerce literature (Hartman et al, 2000; Marshall et al, 2000; Kalakota and Robinson, 1999). The finding in this study reveals that organizational commitment to eCommerce which could be manifested through having clear vision and strategy and communicating those to every member of the organization, as well as senior management championship of eCommerce activities and resource allocations significantly affect the maturity level of eCommerce adoption.

Related to commitment, the operational framework an organization puts in place to manage eCommerce activities was also found to significantly affect eCommerce maturity. Although we submit to the position that there is no one and best way of managing in all circumstances, the finding indicates that organizations with change readiness capabilities; which have thought about the changes associated with eCommerce and put in place clear roles, responsibilities and authorities in managing their eCommerce activities as well as matrices for measuring results appear to progress relatively well in institutionalizing eCommerce to support their activities. This finding gives empirical credence to the propositions made by Hartman et al (2000), Agrawal and Rao (2000) and Tabor (2000) on the importance of "good" organizational governance in eCommerce.

Finally, the resources and awareness components of eReadiness do not appear to be significant beyond entry-level eCommerce adoption in affecting the maturity of eCommerce adoption.

One possible explanation could be that these factors might be necessary but insufficient after entry-level eCommerce adoption indicating the possibility of "hygienic" influence. The external validity of this finding depends on further investigation of the model in another developing country context.

To summarize, the key finding here is that there is strong support for the interactionism perspective this thesis was pursuing. In particular, once an organization makes the initial decision of adopting eCommerce, which is significantly influenced by awareness, resources as well as market forces eReadiness, the institutionalization of eCommerce depends on the commitment and governance model the organization puts in place and the external eReadiness factors, namely, market forces, government and supporting industries.

The above discussion can therefore be summarized with the following conclusions: (1) in developing countries, organizational factors, especially the human, business and technological resources as well as awareness, are more influential than environmental factors in the initial adoption of eCommerce and (2) in developing countries, as organizations adopt more sophisticated eCommerce practices, the advantages from resources become less important and environmental factors together with commitment and the governance model the organization put in place affect the maturity level of eCommerce adoption.

Although our conclusion indicates an interactionism influence of eCommerce adoption, it can be related to Tolbert and Zucker's (1983) (in Wolfe, 1994) conclusion that "initial" adoption of an innovation is best explained by internal organizational "fitting" of the innovation and later adoption on the other hand is best explained by an institutional perspective, that is, the need for legitimacy in the wider social structure.

8.5 eREADINESS AND SUCCESS OF eCOMMERCE DEVELOPMENT and BENEFITS (Adopters Only)

The previous section presented the validation of a novel model for one of the facets of eCommerce success, that is, eCommerce adoption, in developing countries. Obviously, the model requires further testing before its external validity is unequivocally claimed. For organizations that have adopted eCommerce at various levels and incorporated it into their operations, we have hypothesized that eReadiness affects the successes of their eCommerce development and benefits, that is, communication improvement, market place and cost saving

benefits (henceforth eCommerce success in this section refers to these measures). The profile analysis in section 8.3 reveals preliminary support for the existence of such relationships although the direction is not as yet clear. Furthermore, we have also hypothesized that eReadiness explains the overall satisfaction with the performance of eCommerce systems- our global variable to measure eCommerce success. This section provides the tests of the above hypotheses and discusses the results.

8.5.1 Model and Hypotheses Specification

Figure 8.8 represents the research model reconstructed conjuring possible relationships among eReadiness factors and success of eCommerce development and benefits. The dependent variables are the successes of eCommerce development (alias development), communication improvement (alias communication), market place benefits (alias market place), cost saving benefits (alias cost saving) and overall satisfaction with the performance of eCommerce systems (alias overall satisfaction). All these dependent variables were measured on a Likert-type scale, ranging from strongly agree (1) to strongly disagree (5) with only the extreme points anchored. Therefore, the scale can be considered as an interval scale allowing the use of metric based Multivariate data analysis techniques (Hair et al, 1979). Table 8.7 details the individual hypotheses.

Figure 8.8 A model for eReadiness and Success of eCommerce Development and Benefits

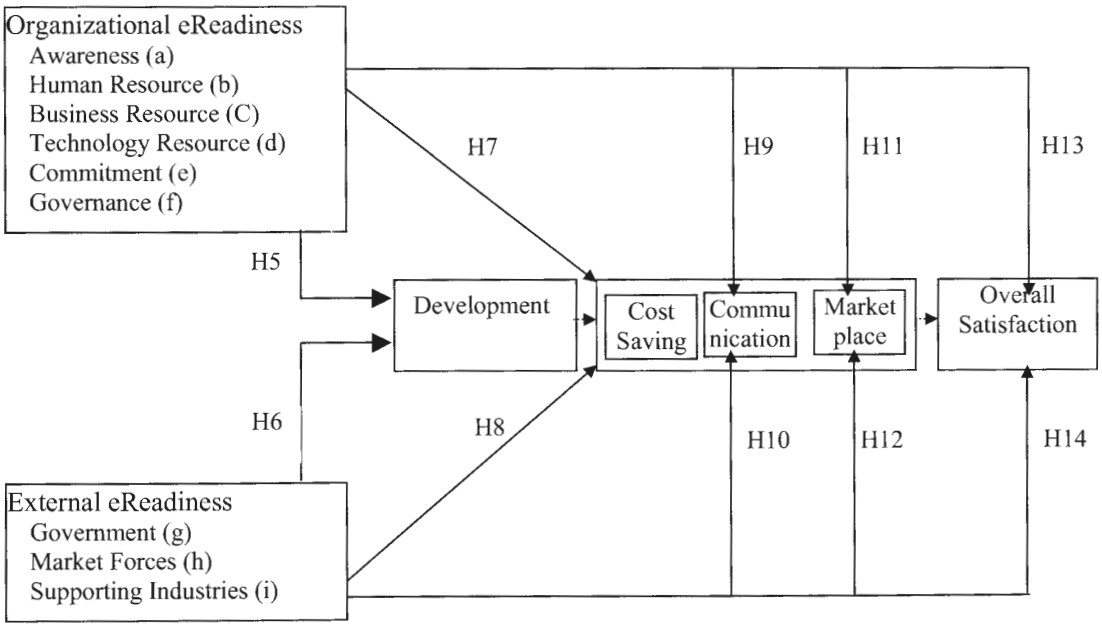


Table 8.7 Hypotheses for Success of Development and Benefits

Hypothesis ID	Description
H5a	Awareness contributes significantly (and is positively related) to success of eCommerce development
H5b	Human resources contribute significantly (and is positively related) to success of eCommerce development
H5c	Business resources contribute significantly (and is positively related) to success of eCommerce development
H5d	Technological resources contribute significantly (and is positively related) to success of eCommerce development
H5e	Commitment contributes significantly (and is positively related) to success of eCommerce development
H5f	Governance contributes significantly (and is positively related) to success of eCommerce development
H6g	Government eReadiness contributes significantly (and is positively related) to success of eCommerce development
H6h	Market forces eReadiness contributes significantly (and is positively related) to success of eCommerce development
H6i	Support industries eReadiness contributes significantly (and is positively related) to success of eCommerce development
H7a	Awareness contributes significantly (and is positively related) to cost saving benefit
H7b	Human resources contribute significantly (and is positively related) to cost saving benefit
H7c	Business resources contribute significantly (and is positively related) to cost saving benefit
H7d	Technological resources contribute significantly (and is positively related) to cost saving benefit
H7e	Commitment contributes significantly (and is positively related) to cost saving benefit
H7f	Governance contributes significantly (and is positively related) to cost saving benefit
H8g	Government eReadiness contributes significantly (and is positively related) to cost saving benefit
H8h	Market forces eReadiness contributes significantly (and is positively related) to cost saving benefit
H8i	Support industries eReadiness contributes significantly (and is positively related) cost saving benefit
H9a	Awareness contributes significantly (and is positively related) to communication improvement benefit
H9b	Human resources contribute significantly (and is positively related) to communication improvement benefit
H9c	Business resources contribute significantly (and is positively related) to communication improvement benefit
H9d	Technological resources contribute significantly (and is positively related) to communication improvement benefit
H9e	Commitment contributes significantly (and is positively related) to communication improvement benefit
H9f	Governance contributes significantly (and is positively related) to communication improvement benefit
H10g	Government eReadiness contributes significantly (and is positively related) to communication improvement benefit
H10h	Market forces eReadiness contributes significantly (and is positively related) to communication improvement benefit
H10i	Support industries eReadiness contributes significantly (and is positively related) to communication improvement benefit
H11a	Awareness contributes significantly (and is positively related) to market place benefit
H11b	Human resources contribute significantly (and is positively related) to market place benefit
H11c	Business resources contribute significantly (and is positively related) to market place benefit
H11d	Technological resources contribute significantly (and is positively related) to market place benefit

H11e	Commitment contributes significantly (and is positively related) to market place benefit
H11f	Governance contributes significantly (and is positively related) to market place benefit
H12g	Government eReadiness contributes significantly (and is positively related) to market place benefit
H12h	Market forces eReadiness contributes significantly (and is positively related) to market place benefit
H12i	Support industries eReadiness contributes significantly (and is positively related) to market place benefit
H13a	Awareness contributes significantly (and is positively related) to overall satisfaction
H13b	Human resources contribute significantly (and is positively related) to overall satisfaction
H13c	Business resources contribute significantly (and is positively related) to overall satisfaction
H13d	Technological resources contribute significantly (and is positively related) to overall satisfaction
H13e	Commitment contributes significantly (and is positively related) to overall satisfaction
H13f	Governance contributes significantly (and is positively related) to overall satisfaction
H14g	Government eReadiness contributes significantly (and is positively related) to overall satisfaction
H14h	Market forces eReadiness contributes significantly (and is positively related) to overall satisfaction
H14i	Support industries eReadiness contributes significantly (and is positively related) to overall satisfaction

8.5.2 Findings

The hypotheses relating to the development, benefits and satisfaction facets of eCommerce success are tested using Canonical Correlation Analysis (CCA). Whereas most researchers use multiple regression analysis in this kind of scenario, such a technique is appropriate to predict the value of a single dependent variable from a linear function of a set of independent variables. However, the model depicted in figure 8.8 involves sets of multiple criterion (dependent) and multiple predictor (independent) variables. In such situations, Hair et al (1995; 1979) recommend the use of CCA.

CCA is a multivariate statistical model, which allows for the study of interrelationships among sets of multiple dependent and independent variables (Hair et al, 1979). It is appropriate to identify relationships between predictor and criterion variables and relative contributions of each independent variable to the relationships. CCA involves first extracting the canonical functions from the set of dependent and independent variables, then deciding on the functions (roots) to be considered for interpretation and then thirdly identifying the variables that contribute significantly to each of the extracted functions. The number of functions extracted from CCA is normally equal to the number of variables in the smallest data set, that is, independent or dependent.

Our analysis of the data extracts five functions (equal to the number of variables in the dependent variables set). The overall result reveals that (*Canonical R=0.87568;*

$\chi^2(45)=120.816$ $p=0.00839$) the entire model is significant. Table 8.8 provides a summary of the CCA results.

Table 8.8 Summary of Canonical Correlation Analysis

Variables	Canonical Loadings				
	Function 1	Function 2	Function 3	Function 4	Function 5
Criterion (eCommerce Success)					
Success of development	**0.827**	-0.249	-0.150	-0.409	-0.253
Communication Improvement	0.322	**0.687**	0.147	-0.421	0.102
Cost saving benefits	0.461	**0.611**	-0.178	0.327	-0.525
Market place benefits	**0.756**	0.044	0.120	0.545	0.339
Overall satisfaction	0.319	0.323	**-0.709**	-0.379	0.384
Predictors (eReadiness					
Awareness	0.323	0.014	0.252	-0.219	-0.208
Human Resources	**0.593**	-0.224	0.242	0.235	-0.508
Business Resources	**0.498**	**0.393**	0.153	0.242	-0.390
Technology Resources	**0.802**	0.013	0.227	-0.337	-0.042
Commitment	**0.747**	0.192	-0.012	0.240	-0.029
Governance	**0.872**	0.107	-0.290	0.087	-0.116
Government eReadiness	0.174	-0.017	**-0.662**	-0.213	-0.468
Market Forces eReadiness	0.388	**0.430**	0.143	0.063	-0.191
Supporting Industries eReadiness	0.121	**0.773**	0.168	-0.422	-0.201
Canonical R	***0.876***	***0.727***	***0.549***	***0.412***	***0.252***
Canonical Root (R^2)	***0.767***	***0.528***	***0.302***	***0.170***	***0.063***
Chi-Square	***120.816***	***70.938***	***39.309***	***5.601***	***0.781***
Level of Significance	***0.008***	***0.016***	***0.054***	***0.935***	***0.978***
Degree of Freedom	***45.000***	***32.000***	***21.000***	***12.000***	***5.000***
Variance Extracted	***0.535***	***0.322***	***0.133***	***0.007***	***0.004***
Redundancy Index	***0.410***	***0.170***	***0.040***	***0.001***	***0.000***

Once the functions are extracted, the next stage is identifying those to be considered for further interpretation. Hair et al (1979) suggest that three criteria have to be used in conjunction with one another as a means of deciding which Canonical functions to interpret. The criteria are (1) The level of statistical significance (2) the magnitude of canonical correlation and (3) The redundancy index. Hair et al further suggest minimum acceptable benchmarks for the level of statistical significance and the magnitude of canonical correlation as $p=0.05$ and R>0.45 respectively. However for the redundancy index they state that there is "*no generally accepted guideline and the decision is usually made based on the contributions of the findings toward better understanding of the research problem being studied*" (Hair et al, 1979: 186). However, the Redundancy Index is comparable to multiple regressions' R^2 statistics and provides a

summary measure of the ability of a set of predictor variables (taken as a set) to explain variation in the criterion variables (taken one at a time).

Based on the above criteria, three of the five functions are considered for interpretation (Function 1, Function 2 and Function 3 in Table 8.8). In two of the functions (Function 1 and 2), the canonical relationship is statistically significant and both the magnitude of the canonical root (R^2) and the redundancy index are acceptable. In the third case, while the function is statistically significant ($p=0.05$) and the canonical $R>0.45$, the redundancy index is low. Nonetheless, following Hair et al's suggestion quoted above, we believe that interpreting this function is essential as the relationship between the predicator and criterion variables is negative.

In CCA, some treat R^2 as an indicator of the variance extracted by the independent variables. Before proceeding further, it is important to clarify this common misunderstanding. R^2 , in CCA represents the *variance shared* by the linear composites of the sets of criterion and predictor variables and not the variance extracted from the sets of variables. That is, $R^2 = 0.78$ in the first function (Table 8.8) should not be interpreted as to mean that 78% of the variance in the dependent variables in function 1 is explained by the set of independent variables in that function. One has to refer to the redundancy index as a measure of "*explained variance*"(Hair et al, 1995; 1979).

After identifying the Canonical functions to be interpreted, the next step is to identify the relative importance of each of the variables in deriving the canonical relationships. Hair et al (1979) propose three methods- *(1) Canonical loading (2) Canonical weights and (3) Canonical cross loadings*. Hair et al (1979:189) indicated that all the three methods are valid methods of analyzing the canonical function and the choice of one over the rest is a choice of strength and has to be made "*whenever possible*". However, Hair et al (1979:189) recommend the use of Canonical cross-loading in assessing the relative contribution of each variable to each of the canonical functions whenever such results can be obtained. Nonetheless, STATISTICA 6.0 © 1984-2001, the statistics package we used for analyzing the data (which is the latest release), does not provide Canonical cross-loadings output. In addition, our attempt to get "canonical cross loading" results by using other software was not successful as SPSS 10.1, another commercially available statistical package at the time of making the analysis, does not at all provide canonical analysis techniques.

Considering the fact that every research is constrained by resources and one has to make the most out of the available resources, getting "canonical cross loading" results was not possible under the circumstances and we have to settle for canonical loadings. In this connection, Hair et al (1979:190) pronounce that *canonical loadings approach is somewhat more valid than the use of weights therefore whenever possible it is recommended that loadings approach be utilized.* In general, Canonical loadings reflect the variance which the observed variables share with the canonical variate and can be interpreted like factor loadings in assessing the relative contribution of each variable to each canonical function (Hair et al, 1979).

Based on the Canonical loadings, the following variables are identified as significantly related in each of the three functions:

- Function 1: governance, success of development, technology resource, market place benefits, commitment, human resources and business resources (in descending order of canonical loading)
- Function 2: Supporting industries, communication improvement, cost saving benefit, market forces and business resources
- Function 3: Overall satisfaction, government

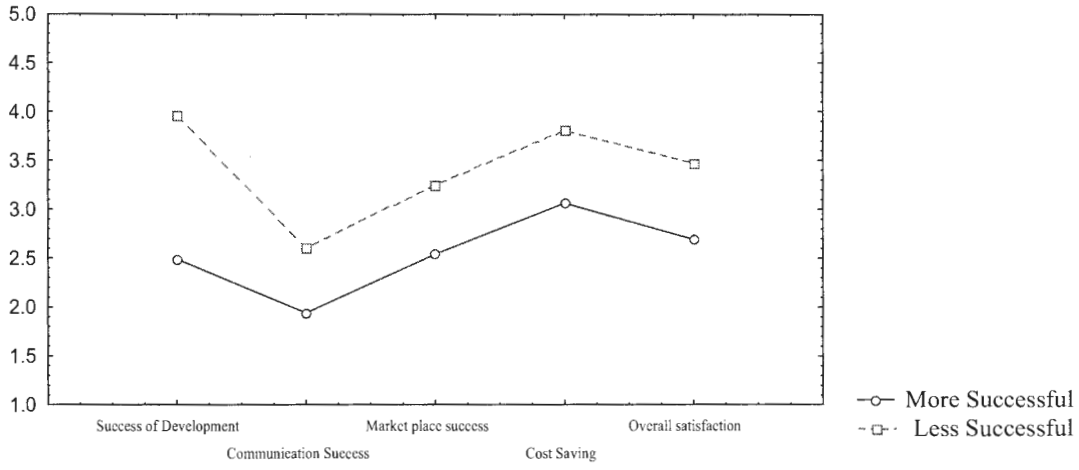
The above results are interpreted in the following ways

- The combination of human, business and technological resources together with commitment and governance significantly affect differences in the success of eCommerce development and market place benefits. Such that 41% (redundancy index for function 1) of variations in success of development and market place are explained by these five factors
- The combination of supporting industries, market forces eReadiness, and business resources significantly affect eCommerce success related to cost savings and communications such that the three factors account for 17% (redundancy index for function 2) of variations in cost savings from eCommerce and communications improvement as a result of eCommerce implementations
- Dissatisfaction with overall eCommerce performance (negative canonical loading) is significantly related to the perception of lack (negative canonical loading) of government's eReadiness

In general, the CCA provides support for the following hypotheses: H5b, H5c, H5d, H5e, H5f, H7c, H8g, H8h; H9c, H10g, H10h, H11b, H11c, H11d, H11e, H11f; H14g.

To explore the above findings further, the author uses cluster analysis to divide the organizations (adopters only) into two categories based on their eCommerce success profile. This has resulted in a relatively more successful and relatively less successful sub-samples. The first group contains 57 respondents and the second 35 respondents. A visual impression of this is provided in Figure 8.9.

Figure 8.9 Two Cluster eCommerce Success Profile



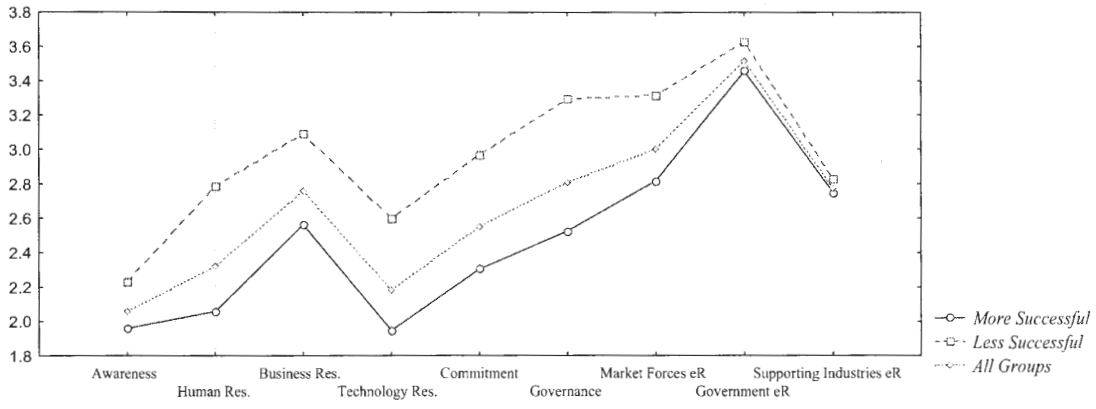
A discriminant function analysis is performed to identify the eReadiness factors that discriminate between the "relatively successful" and "relatively less successful" businesses in the sample. This is consistent with Hair et al's (1979) recommendation of creating an artificial dichotomy from interval measurements in order to use discriminant analysis.

The discriminant analysis produces a statistically significant model consisting of two variables: governance and technology resources (*Wilk's lambda= 0.70; $\chi 2$= 27.79; df = 2; F= 16.66 p<0.0000*). The function correctly classifies 73% of the businesses (74% relatively more successful and 73% relatively less successful). The squared Mahalanobis distance between the groups is 11. The variables that contribute significantly to the discriminant function are governance and technological resources. Therefore, it can be concluded that these variables allow discriminating relatively successful from less successful businesses. However, because

the two clusters are the artifacts of the study (constructed for the purposes of analysis) rather than naturally occurring groups the interpretation of this result has to be cautioned.

The cluster analysis also provides a pattern where both "relatively successful and less successful businesses", the main advantage from eCommerce, so far, appears to be improvements on internal and external communication. On the other hand, cost saving benefits as a result of eCommerce, are the least experienced. This could in part be explained by the current status of eCommerce as discussed in chapter 7. The cluster analysis also suggests that the organizations are not generally satisfied by the overall performance of their eCommerce implementations. The eReadiness profile of the relatively successful and less successful businesses is plotted in Figure 8.10. The profile indicates that on all measures of eReadiness, the relatively successful groups demonstrate a better profile of eReadiness.

Figure 8.10 Two Cluster eReadiness Profile



8.5.3 Discussion

8.5.3.1 Success of development

This study hypothesized that eReadiness factors explain differences in the success of eCommerce development. Success of eCommerce development was operationalized using two conventional measures, that is, whether the eCommerce projects were completed within budget and within schedule. The profile analysis discussed in section 8.3 reveals that, overall, the respondents indicated that their eCommerce projects were not delivered on time and within budget. It is therefore interesting to find out, first if there is a relationship between eReadiness and success of eCommerce development and second the factors that are responsible for such a

relationship. This is of high importance to developing countries where the IT literature indicates that many projects end in some sort of failure (Heeks and Bhatnagar, 1999).

The finding reveals that some 41% of the variation in the success of eCommerce development is explained by organizational eReadiness factors. Previous studies indicate that management and organizational factors bear a strong influence on successful IT Implementation (Heeks, 1999; Orlikowski, 1993; Ewusi-Mensah and Przasnyski, 1999). In the same vein, the finding in this study shows that eCommerce projects are likely to succeed where there are good governance model, executive level championship and eCommerce complimentary human, technical and business resources. Overall, our finding affirms what Keen (in Powell and Dent-Micallef, 1997) refers to as the "fusion" perspective, which indicates success of eCommerce development based on a fusion of human, business and technology resources, with management commitment and governance producing the best results. The findings also support the premises underlying the sociotechnical system studies (Guha et al, 1997; Shani and Senn, 1994) and can be supported by Enns and Huff's (1999) framework for the successful implementation of IT in developing countries.

Moreover, the finding submits to Hartman et al's (2000) suggestion that success in eCommerce is unlikely to come to organizations which are 'conspicuously short ' in any of the forces of organizational eReadiness. In particular, eCommerce governance and commitment issues emerge as chief factors weighing the relationship between eReadiness and success of eCommerce development. This finding compares with emerging studies in eCommerce including those by Heijden (2000); Sambamurthy and Zmud (2000) and Turban et al (2000) and an earlier study in IT by Willcocks and Griffiths (1997). It also supports findings from IT implementations in developing countries (Montealegre, 1999b; Boer and Walbeek, 1998; Jarvenpaa and Leidner, 1998). Nonetheless, it reveals the significant challenges that organizations in developing countries have to prevail over in order to secure timely and within budget delivery of eCommerce projects, as they tend to materially lack such capabilities (Jarvenpaa and Leidner, 1998; Montealegre, 1998).

Governance issues are not mere project management issues and rather set the 'critical parameters in which effective project management can take place' (Willcocks and Griffiths, 1997). The result in the current study suggests that organizations are likely to attain success of eCommerce development where managers understand the magnitude of the required

organizational changes and prepare for dealing with these changes adroitly. This involves, *inter alia,* defining roles, responsibilities and accountabilities related to eCommerce initiatives and delegating the authority, but without withdrawing top management support, for those responsible for making decisions related to eCommerce.

Successful eCommerce development also depends on the level of organizational commitment. In particular, in developing countries, because of a strong sense of hierarchical relationships (UNCTAD, 2001; Vreede et al, 1999), the extent to which top management involves and champions eCommerce developments will have a significant impact on the success of eCommerce development. eCommerce projects supported and championed by top-management are likely to be successful as such championship builds momentum throughout the organization and channels appropriate resources. The literature is littered with sufficient and unequivocal examples of the role of commitment to the successful implementation of IT.

The finding regarding commitment except for reinforcing the existing studies might not add anything new. Nevertheless, it is important to stress that senior management commitment, despite its significance, might not necessarily produce the best results unless supported by the readiness of the entire organization to buy-in the ideas of moving into eCommerce and to show support. In addition, sustained commitment is a crucial issue to be considered in relation to eCommerce and developing countries because initial commitment is of limited value if managers withdraw their support at a latter stage, as most of them in developing countries have been found to be doing (Vreede et al 1999; Galleries et al, 1998; Munene, 1995). The key lesson from this finding is that managers in developing countries require a dramatic shift from the common "ignore" and "isolate" approach (Heeks, 1998a) that they commonly maintain towards IT projects and get involved actively.

The contribution of resources to successful development of eCommerce cannot be overemphasized. This finding again complements previous findings and indicates key challenges that organizations in developing countries have to deal with. However, a major advantage of this finding is that the framework enables organizations to systematically investigate their resources with respect to a proposed eCommerce activity, which will then inform the subsequent task of eCommerce project and risk management. Interestingly though, the external eReadiness factors do not appear to have much influence in the success of eCommerce development.

Finally, eCommerce implementation is not a single process (or, indeed, a single project), but rather a series of stages or projects, for which different driving forces may trigger the initiatives. Therefore, further studies are recommended to extend the study here by investigating the impact of eReadiness on different stages of eCommerce implementations.

8.5.3.2 eCommerce benefits

An interesting relationship (consistent with the interactionism perspective) has been observed between eReadiness and the eCommerce benefits: communication improvement, cost saving benefits and market place benefits. While organizational eReadiness factors significantly affect market place benefits, external eReadiness forces influence communication improvement and cost saving benefits. However, the correlation among the dependent variables hints to a strong relationship that future studies might be interested in exploring further.

Four items (extending firms reach, product/service differentiation, increased customer loyalty and improved customer relationship) operationalize market place benefits. The result here indicates that these benefits are influenced by the eCommerce governance model organizations put in place, senior management commitment and human, business and technological resources of the organization. This finding provides further credence to the fusion perspective and is consistent with the premises of the resource-based and sociotechnical theories. Governance and commitment variables, in particular, emerge as chief factors contributing to market place benefits. Organizations might significantly differ in the way they govern their eCommerce activities. Such differences in management might lead to differences in competitive and economic benefits organizations gain from their eCommerce activities. While the thesis submits that there might not be one best way of governing eCommerce activities (Agrawal and Rao, 2000; Hartman et al, 2000), it is also possible, based on the findings of the study, to highlight some issues.

Organizations that repudiate traditional hierarchies and relinquish eCommerce decision making authority (as captured through the items that operationalize governance) to those that are best placed to do so appear to progress well on the path of eCommerce and obtain relatively better market place benefits from their eCommerce investments. This finding of the study reveals that the benefits of eCommerce for developing countries might not easily materialize unless organizations are ready to adjust their styles of management and communication.

In addition, the finding gives credence to the recent UNCTAD report on eCommerce and development which postulates *"...the potential of e-commerce to become an engine of development will not be realized if investment in infrastructure, equipment and human resource development does not go hand in hand with profound modifications in the organization and management of companies. Fundamental changes need to be made, in particular in assigning authority and responsibility in public and private organizational structures"* (UNCTAD, 2001).

Organizations that cultivate broad-based buy-in throughout the organization and that communicate their vision and goals as well as the extent and impact of changes to all their employees appear to be performing well. On the other hand, eCommerce might perform poorly in the absence of integration with other systems of the organization and this particular finding has strong support from emerging eCommerce studies (Truman, 2000; Kettinger and Hackbarth, 2000). This will definitely be a challenge for most of the organizations in developing countries that are grappling to "automate" and "informate" (Zuboff, 1988) even their basic applications.

Human, business and technological resources also contribute to the market place benefits. This is consistent with the tenets of resource-based theory whereby the routines, processes, skills and other resources organizations build give them a competitive advantage in the market place (April and Cradock, 2000). Organizations' ability to maintain and manage their relationship with suppliers, customers and other partners occupy a central role in eCommerce (Kalakota and Robinson, 1999). The finding in this regard reveals that building and maintaining trusting and economically viable relationships and leveraging those relationships using eCommerce applications could contribute significantly towards ensuring better market performance. This is of particular challenge to businesses in developing countries and is materially affected by the extent to which an organization's business partners are able and willing to adopt eCommerce.

External eReadiness forces have also materialized as affecting communication improvement and cost saving benefits. In particular, market forces eReadiness and supporting industries eReadiness explain some 17% of the variations in communication improvement and cost saving benefits. This finding gives further credence to the interactionism perspective in general and to network externalities and institutional theories in particular and indicates the influence of external eReadiness forces on the benefits organizations expect to get from eCommerce.

Therefore, eCommerce benefits to developing countries depend not only on the fusion of organizational eReadiness forces, but also on the forces of the external environment.

Cost reduction is probably the most widely acclaimed benefit of eCommerce for developing countries (UNCTAD, 2001; Eze and Seong, 2001; Kebede, 2001; Chappell and Feindt, 1999). Reducing costs as a result of eCommerce in part depends on the cost of eCommerce participation, which is significantly affected by the supporting industries and market forces eReadiness. Organizations that manage to leverage their relationships with suppliers, customers and other partners electronically are in a better position to gain cost advantages. For example, electronic markets allow creating "communities of commerce" (Hartman et al 2000) by bringing a large number of buyers and sellers into one trading community which in turn results, *inter alia,* in reducing operation, marketing and procurement costs.

One of the arguments of the potential of eCommerce to developing countries is making information transfer faster, cheaper and simpler. Nevertheless, this benefit depends considerably on the adoption of eCommerce by customers, suppliers and other partners of an organization. Therefore, benefits related to communication go to firms whose market forces are ready to conduct business electronically. This again is consistent with the tenets of network externalities in which the benefit and value of using a network depend, among other things, on the size of the network (Sillince et al, 1998; Baily et al, 1995).

8.5.3.3 Satisfaction with the performance of eCommerce

Interestingly, dissatisfaction with the performance of eCommerce is related to dissatisfaction with government's eReadiness. However the perceived lack of government eReadiness in terms of placing legal and policy frameworks do not appear to materially detract from the other facets of eCommerce success. This is consistent with eCommerce development in the rest of the world including the eCommerce-savvy countries where eCommerce has flourished without the existence of specific e-commerce legislation. However, this should not by any means undermine the role governments can play in facilitating, and even at times showcasing eCommerce implementations, as the literature on eGovernment would advocate.

8.5.3.4 Discriminators of successful and less successful businesses

Overall, governance and technology resources surface as chief factors discriminating relatively more successful and less successful businesses. Nonetheless, it is important to recognize that

any sustained advantage is context specific, that is, there are no universal sources of advantages (Barney, 1997). As a result, while organizations in developing countries in general and South Africa in particular might consider excelling on these two issues, they might as well consider the importance of both internal and external contexts.

Summarizing the discussion in this section, the key point that should emerge is that the relationships between the factors of eReadiness (both organizational and external) and the way in which they fuse result in a unique profile for an organization and that in turn affects the success of eCommerce development and benefits. This is consistent with the interactionism perspective we were pursuing throughout this study.

8.6 SUMMARY AND CONCLUSION

Multivariate data analysis techniques were used to analyze the data. The data was tested to ensure normality and non-multicollinearity assumptions. The results indicated that there were no gross violations of those assumptions.

Profile analyses were conducted before formally testing the research model and hypotheses. The results revealed that the responding organizations profiled better in terms of their own rather than the external environment's eReadiness. Moreover, while the organizations demonstrated better profile of awareness and technological resources, they exhibited weak profile of governance and business resources. Overall, the government's eReadiness received the lowest rating. On the other hand, the eCommerce success profile revealed that eCommerce benefits are mainly limited to communications improvement benefits. Nonetheless, the eReadiness and eCommerce success profiles revealed strong relationships. The results and the observed relationships did not appear to be sensitive to organizational size and sector differences.

The analysis proceeded by reconstructing the research model into two sub-models: one for eCommerce adoption and another for the success of eCommerce developments, benefits and a global measure of overall satisfaction with the performance of eCommerce. The findings showed that there is a direct match between the profiles of eReadiness and eCommerce success. This proves the central argument of this thesis- the interactionism perspective.

In particular, the result revealed that organizational factors contribute the most to the observed differences in various facets of eCommerce success. The impact of the resources and governance dimensions of organizational eReadiness is most notable.

Our finding is comparable to the finding of the UNCTAD, which based on a survey of eCommerce activities in 16 least developed countries (LDC) concludes *"...that the most serious problem for LDC enterprises as they embark on e-commerce is not technology but the need to change their business culture and practices"* (UNCTAD, 2001). This implies that the study and findings here stand a good chance of external validity. Of the external eReadiness forces, market forces eReadiness appeared to have a significant influence indicating the effects of network externalities. Nevertheless, the extension of the findings documented here to other developing countries requires further research as the results might have been influenced by the broader South African context (described in Appendix I). However, the model described in this study together with the instrument is sufficiently valid to guide such studies.

A practical question that should emerge from the finding and discussion hitherto is how much of the desired attributes of eReadiness should businesses demonstrate. Or putting it another way, how eReady should organizations be? As argued earlier in chapter four, this study works on the premise that eReadiness is not a one-off thing that organizations demonstrate before embarking on eCommerce but rather that it is a construct continuously being shaped and developed by the interaction of organizational and environmental forces as organizations accumulate their capabilities; learn from their past experiences and interact with their environment, which in itself is in a state of change. Especially, in the age of the Internet where speed is an important consideration in business, it will be impractical for businesses to wait before they are "eReady", if at all such a state of equilibrium exists. Therefore, it is necessary for businesses to migrate to eCommerce (using various entry-level strategies) and at the same time work towards improving their eReadiness profiles.

The results of this study, based on an interactionism perspective, contribute theory-based conceptual and empirical evidence to the eReadiness literature in developing countries, which is heavily dominated by the proliferation of assessment tools, anecdotes and environmental determinism perspectives. The findings also provide support for the resource-based theory in the eCommerce success and in developing country contexts. Earlier works by Jarvenpaa and Leidner (1999) and Zhuang (1999) extend the resource-based theory to the developing country

and eCommerce contexts respectively. The use of the theory in this study is therefore a further extension of the theory complementary to earlier works.

Furthermore, the finding affirms the interactionism perspective, which implies eCommerce success based on a fusion of organizational (human, business and technology resources, with management commitment and governance) and environmental forces producing the best results. The finding also supports the premises underlying the sociotechnical system studies and network externalities theories. They also support an accumulating body of institutional perspective studies, in which the forces of the external environment have been recognized as affecting the strategic choices and decisions of individual organizations.

With the above results and discussions, the next chapter summarizes the key findings of the study, discusses the theoretical and practical implications of the results, highlights some of the limitations in the current study and charts avenues for future studies.

CHAPTER NINE

SUMMARY AND CONCLUSIONS

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"The net may well become the primary space in which we all do business but it is still a hostile environment for organizations unprepared for the uncertainties and risks. Luckily net success has been shown to be a function of Net Readiness. Is your organization prepared?"(Hartman, Sifonis and Kador, 2000: 271)

9.1 INTRODUCTION

Despite its widely acclaimed potential to transform business and contribute to development, eCommerce is, as yet, predominantly a North American and Western European phenomenon. Estimates vary, but generally agree that both online revenues and activities are confined within the borders of a few countries, most notably the US. The slow development of eCommerce in other countries is a matter of great concern for the health of the global economy. Especially, it has been argued that the failure of developing countries to act promptly would have an impact far beyond their borders in affecting global productivity. While many have intuitively speculated the reasons behind their lag, systematic analysis is scant.

Arguably, the most salient obstacles to the development of eCommerce in many of the developing countries are the lack of necessary infra and infostructure. However, insights from the interactionism perspective suggest that one should look beyond these environmental constraints to examine how the organization and management of businesses in developing countries to handle specific demands of eCommerce and the environment within which the organizations operate fuse and contribute to (or undermine) the success of eCommerce.

Working from an interactionism perspective and using a theoretically eclectic approach, this study argued and provided supporting empirical evidence that what the study conceptualized as "eReadiness" affects what the study conceptualized as "eCommerce success" in developing countries. Subsequently, the study proposed and explored a model that helps to identify the factors that affect various facets of eCommerce success in developing countries context. A number of conclusions and directions for future studies can be drawn from the current study.

9.2 THE RESEARCH QUESTIONS REVISITED

Returning to the research questions posed in the introductory chapter, the following points are argued for in conclusion.

Because eCommerce represents a complex and context sensitive innovation, it cannot be understood without careful consideration to the context within which it is to be diffused. The context is both organizational and environmental. For established businesses in developing countries, migrating to eCommerce represents a continuous process of innovation. Unless organizations in developing countries carefully nurture, support, resource and purposefully govern it, eCommerce success will be seriously constrained. However, current wisdom of eCommerce in developing countries considers only environmental constraints and rarely addresses organizational issues. While we are not here to completely deprecate the role of the external environment, this thesis, working from an interactionism perspective, challenges the notion of environmental determinism. It argues that the blends of organizational and environmental factors are responsible for affecting eCommerce success in developing countries.

Therefore, if organizations in developing countries are to migrate to eCommerce and contribute both to their success and to the health of the global economy, the interactionism perspective demands that the internal organizational and external environmental challenges associated with eCommerce must be recognized and addressed. A synchronic profile of the organizational and environmental constructs underpins the concept of eReadiness. eReadiness affects the success of eCommerce diffusion. Successful executions of the various phases of innovation diffusion (adoption, development, deployment and benefits) form the concept of eCommerce Success. In conclusion, the concepts of eReadiness, eCommerce success and their relationships are reiterated here by the way of answering the research questions posed at the beginning of the thesis.

9.2.1 eReadiness

Research Question1: What is eReadiness, what are its dimensions and how can it be measured in developing countries context?

Over the last two years, an increasing number of studies have been discussing eReadiness in general and in developing countries in particular. Nevertheless, the majority of them,

especially those referring to developing countries, have appeared to focus on developing assessment tools rather than understanding and explaining the underlying concept. As a result, a number of eReadiness assessment tools, of which no two are alike, have proliferated. Most of these tools are atheoretical. To date, studies that are based on one or more of these tools have primarily focused on the indigenous constraints with which organizations in developing countries must contend. However, these are not the only factors influencing eCommerce in developing countries. In particular, so far, very little attention has been given to the firm level analysis of eReadiness and those that did materially suffer from a limited repertoire of variables. Overall, the existing literature does not convey a theory-based understanding of eReadiness, without which its usefulness for academic investigation and knowledge building is very limited. In addition, what to measure and assess needs to reflect the conceptualization so that comparisons, implications and generalizations would be possible.

eReadiness in this study is conceptualized as a profile that shows a synchronic assessment of the organizational and environmental contexts of eCommerce. Thus conceptualized, the concept represents two constructs: organizational eReadiness and external eReadiness. The Organizational eReadiness profile indicates the status of the organization in term of awareness, commitment, governance and resources (business, human and technological) vis-à-vis the demands and requirements of eCommerce. On the other hand government, market forces and supporting industries readiness form the external eReadiness construct. This conceptualization draws from a wide variety of theoretical perspectives such as sociotechnical, resource-based view, organization ecology, institutional and competitiveness theories. It is also the result of the preliminary studies and consultations with various experts in the field we have undertaken and we believe that it is closer to the realities of developing countries.

There are many models for analyzing organizations. A model that has received wider acceptance in the management, organizational change, information systems and innovation literature is the sociotechnical system theory of organization. The theoretical leg of the sociotechnical system coupled with the resource-based theory allowed identifying the key components of the organization that define its profile. Our reliance on these theories also provided additional justification (supporting the interactionism perspective) to the hypothesized relationships between the organizational eReadiness variables and eCommerce success.

Nevertheless, the strategic choices and innovativeness of organizations in developing countries is often significantly constrained by the environment within which they operate, even more so when one is dealing with network-based activities such as eCommerce. In contrast to the adoption and subsequent success of stand-alone IT innovations (such as personal computers) the adoption of more complex and sophisticated innovations that cut across organizational boundaries (such as eCommerce) cannot be adequately understood without an in-depth analysis of the external environment.

Established traditions of research in strategic management and institutional economics connect the characteristics of the environment to the strategic choice and general directions of businesses. The scope of such research extends from examining specific aspects of the legal and regulatory environment to the impact of the general characteristics of the nation-state. What aspects of the environment are most important for promoting the adoption, successful development and benefits of eCommerce? Porter's theory of competitiveness and institutional theories provided us with powerful and well-tested theoretical frameworks to analyze the forces of the environment that affect (and in turn be affected by) an organization's eCommerce initiatives. The theories also made credible the hypothesized relationships between the external eReadiness variables and eCommerce success.

Three main benefits can be envisaged from our conceptualization of eReadiness. First, because it is theoretically grounded, this would suggest that the outcome of the study and future studies that may subscribe to our understandings provide more or less a complete coverage of issues that affect eCommerce in developing countries. Thus we argue that the foundation for cumulative research in the area is laid here. Second, it also brings order, guidance and relevance to the process of instrument development, facilitating evaluations of the content and coverage of the constructs. Third, the conceptualization is made to reflect the realities of developing countries hence it can be used as an important frame of reference for similar studies in the area.

The conceptualization of eReadiness entails that organizations assess both their internal and external contexts and determine the profile of eReadiness they demonstrate. Such measurement basically relies on the assessment of the organization, which agents of the organization, in particular CEOs, but also members of top management, are best qualified to do. Their

evaluation however should be as a dispassionate observer or what is normally referred to as "expert witness". The research instrument is developed to reflect this understanding.

On the basis of the above conceptualization of eReadiness and following guidelines of instrument development in the literature, an instrument has been developed, and its psychometric properties rigorously tested and validated. The final instrument contains 43+7 items for the measurement of eReadiness. The instrument is a significant and perhaps so far the only progress towards capturing both the organizational and environmental contexts that affect eCommerce development in developing countries. It can be considered as an appropriate tool for firm level analysis of eReadiness but it might not be the final answer.

9.2.2 eCommerce Success

Research Question 2: How can eCommerce success be conceptualized and operationalized in developing countries context?

"Success" is one of the concepts that is a subject to a plethora of interpretations and amenable to a wide range of evaluation criteria. Empirical studies that investigated eCommerce success have addressed the issue from system, individual, organizational and macro perspectives using a number of criteria. Most of the studies also focus on the post-ante evaluation of eCommerce particularly emphasizing on the outcome aspect. However, one could argue, as we did in this thesis, that the emphasis on only the outcome aspect of success is not very tenable. For example, most argue that the adoption of eCommerce in developing countries, indeed as is the case elsewhere, can be considered as one indicator of eCommerce success as other outcomes and benefits would only materialize following adoption.

Different researchers focus on one or the other aspect of eCommerce success using one or the other criteria mentioned above. If one is to draw an analogy from information systems success literature, despite over 20 years of research, what exactly is meant by "information systems success" does not seam to be clear since the term was introduced to the discipline. The term *success* should therefore not form the basis of arguments about what eCommerce success is and what it is not. Rather the focus should be on the understanding of what the term is used to conceptualize in a particular research set up. This will obviously save researchers from being locked into semantics and debates about what eCommerce success should be or should not be.

Consistent with (1) our argument of considering eCommerce as a continuous process of innovation and (2) our submission to Straub's (1997) conceptualization of innovation diffusion as a continuous process that passes from adoption through implementation, use to performance, we propose that eCommerce success in developing countries can be modeled as a four facet construct each evaluating the execution of the four phases of innovation diffusion. Likewise we suggest four facets of eCommerce success: the success of eCommerce adoption, success of eCommerce development, success of eCommerce deployment and success of eCommerce benefits. By conceptualizing eCommerce success as a progression through the mentioned four facets it is possible to identify a range of issues that affect each of these facets and put them into perspective.

In operationalizing the conceptualization, the study argued for and followed a subjective evaluation approach whereby the agents of the organizations were made to give their assessments of the items that were developed and validated to assess the different facets of eCommerce success. The items for operationalizing the various facets of success were drawn from relevant works on eCommerce maturity stages, project management, network externalities, transactional cost and competitive advantage theories.

Because organizations are at different stages in their eCommerce implementations, it was found appropriate to measure the success of eCommerce adoption using a six-stage eCommerce maturity model. eCommerce adoption, itself, was assessed in terms of two constructs, initial adoption and level of institutionalization of eCommerce (alias maturity level of eCommerce adoption). For those that have "adopted eCommerce", which in this study is defined as having achieved an interactive eCommerce status, an instrument was developed to operationalize and measure the other three facets of eCommerce success: development, deployment and benefits. Items that operationalized the success of deployment did not pass the psychometric tests and as a result that particular construct had to be dropped from the research. In addition, the factor analysis resulted into three distinct factors for the success of benefits. These were subsequently labeled as communication improvement, cost saving benefits and market place benefits and were used in the analysis. In total, 11+1 items with reliability of 0.83 were used to operationalize the success of development, and benefits (communication improvement, cost saving benefits and market place benefit). The +1 item represents a global variable measuring overall satisfaction with the performance of eCommerce.

While we argue that this particular approach in conceptualizing and operationalizing eCommerce success provides a relatively better coverage of eCommerce success, it cannot certainly be claimed as a final solution to the difficulty surrounding the conceptualization and evaluation of eCommerce success. Nonetheless, it can be considered as a step forward in the right direction. The conceptualization also suggests a possibility of interesting relationships, albeit one that deserves an investigation in its own right, among the different facets of eCommerce success.

9.2.3 Relationship Between eReadiness and eCommerce Success

Research Question 3: What is the nature of the relationship between eReadiness and eCommerce Success in developing countries context?

The research has hypothesized that eReadiness contributes to a significant portion of the differences in the eCommerce success of organizations in developing countries. Building on the conceptualizations of the two key concepts (eReadiness and eCommerce success), the theoretical frameworks that informed the conceptualization process; and following the instrument development and validity processes, a model depicting the relationship of eReadiness and eCommerce success is proposed (see Figure 6.2). The model reflects the general thesis of the study that the fusion of **organizational eReadiness** (awareness, commitment, governance and resources (business, human, technological)) and **environmental eReadiness** (government, market forces and supporting industries) forces contribute to (and explain a significant proportion of the differences in) **eCommerce success** (adoption, development, communication improvement, cost saving benefits and market place benefits and overall satisfaction with the performance of eCommerce implementations).

A partial test of the proposed model has been conducted. To facilitate meaningful analysis, the model was reconstructed into two segments: one for the success of eCommerce adoption and another for the success of eCommerce development and benefits. In total, 62 hypotheses have been considered and strong support for 27 of them were obtained. In addition, profile analyses have been conducted.

The empirical results are generally supportive of the argument that eCommerce success depends on eReadiness (both organizational and external) in developing countries and provide a strong validity, albeit preliminary, for the proposed model. It also supports the interactionism

perspective this thesis was pursuing. Nonetheless, at this stage we can only claim to prove association and not causality. Actually, the statistical techniques used to analyze the data lead us to claim only association and not causality.

The profile analysis revealed a direct match among eReadiness, eCommerce maturity and eCommerce success profiles. In terms of the success of eCommerce adoption, the key finding indicates that initial adoption of eCommerce is significantly influenced by awareness, resources as well as market forces readiness. However once the organization makes the initial decision to adopt eCommerce, the institutionalization of eCommerce (that is what business functions and activities are to be supported and how far along the path of eCommerce the organization progress) depends on the commitment and governance model the organization puts in place and the external eReadiness factors, namely, market forces, government and support industries.

Organizational eReadiness factors, most notably governance and commitment but also resources, have emerged as chief contributors to the success of eCommerce development and market place benefits. However, communication improvement and cost saving benefits are significantly influenced by external eReadiness factors of market forces and supporting industries. These findings generally reflect the creeds of the theoretical perspectives that informed the research.

Despite popular belief, the government's eReadiness appeared to have little to moderate influence on the various facets of eCommerce success. This result does not by any means leads one to completely refute the critical role the institutional environment, that is government, plays in creating an e-commerce friendly environment. Indeed, there is little doubt that the future of eCommerce and consumers' confidence in eCommerce wouldn't materialize without government's eReadiness to put in place supportive national legal infrastructure. However, from the results of the study what we can conclude is that government eReadiness is a necessary but insufficient condition for eCommerce.

Interpretations of the above results have to be made in accordance with two considerations: the nature of eCommerce activities in South Africa (Chapter 7) and the broader context of South Africa (Appendix I).

9.3 LIMITATIONS OF THE STUDY

Various limitations to this study can be noted. First, the data for the study is collected mainly from South Africa and without further research, the external validity of the results to other developing countries cannot be claimed at this stage. A replication of the study in other places will help shed light over interesting questions like: do the identified relationships prevail in other settings? What other relationships exist and how are they different from the pattern that emerged in this study? Moreover, despite the rigorous tests used to evaluate the model, additional study is required before unequivocal validity can be claimed.

Second, while we are well aware of arguments for an innovation (model/ technology)-specific approach, such as Scheepers (1999) and Kling (1991), in investigating eCommerce, which obviously allows considering technical and social aspects of a particular innovation, the approach is not followed in this study. Rather, eCommerce is conceptualized generically to represent internet-based applications that are used to conduct business within and among producers, suppliers, customers, government and intermediaries (see Figure 2.3 and Molla and Licker, 2001). This was motivated (and retrospectively empirically supported by the findings discussed in chapter 7) by the fact that eCommerce in developing countries is in its nascent stage and such limited conceptualizations would have made the empirical study impossible.

However, it has recently been argued (and there appears to be a consensus among the circles that debate on this particular issue) that the major prospect of eCommerce for developing countries is going to be business-to-business electronic trading (or eTrading/eMarkets). Future studies might need to focus on this particular aspect of eCommerce and assess how the eReadiness (both organizational and environmental) of organizations in developing countries would affect eTrading success. Such studies might need to include features specific to B2B that might have significant impact on eReadiness, eCommerce success and their interrelationship that the current study was not able to address.

Third, the study did not consider variations due to organizational size. It can however be convincingly argued that the conventional way of measuring business size, that is number of employees, and the argument and conclusions that follow from such analysis need reevaluations in the era of eCommerce. This argument can further be strengthened by the fact that every country has, more or less, its own criteria for classifying small, medium and large businesses (see 7.2.1) making comparisons among size based studies a bit difficult. Whilst the

non-response bias and ANOVA tests did not indicate significant bias as a result of organizations' size in the current study, it might still be worthwhile to consider business size as an issue. The study, however, provides a foundation upon which other studies might build their framework while at the same time addressing the impact of business size.

Fourth, developing viable measures of the eReadiness of the external environment within which businesses operate poses a significant challenge. The challenge is more confounded in collecting data and meaningfully integrating it in a research model. While currently there are a number of eReadiness assessments and reports available from consulting firms, it appears that each of the assessments uses unique methods and criteria in assessing the eReadiness of a country and do not provide reliable data.

In the absence of reliable data on external eReadiness, we turned to an indirect measure of external eReadiness: through the assessment of the business managers. Although this approach is justified by theories that emphasize the role of perceived environment (such as organizational ecology and environmental scanning) and represented the best proxy currently available for the purpose of the study, we acknowledge the shortcomings of the approach and emphasize the exploratory nature of this investigation. Whenever possible, future studies should look for more objective data on the eReadiness of the external environment and integrate it in a research model using more robust econometrics models.

Overall, it is difficult to come to a definite conclusion regarding the extent and/or direction of bias because of the above limitations. However, we do not believe that the above limitations materially undermine the results and interpretations of the study. The study, constrained by the above limitations as it may, makes substantial contributions both to theory and practice. Nonetheless, there is clearly a room for improvement and rich opportunity for further research in the area. In the following two sections the contributions of the study will be discussed first, and will be followed by avenues for future research.

9.4 CONTRIBUTIONS TO THEORY AND PRACTICE

Given the novelty of the study and the preliminary nature of its results, the author is reluctant to overplay the implications for theory and practice. Nevertheless, one could comfortably conjecture the following theoretical and practical contributions from the study

9.4.1 Contributions to Theory

The study's primary contribution to theory lies in developing and substantiating a model of eReadiness and eCommerce success. To the best of the author's knowledge, this is one of the first rigorous studies that examined eCommerce in a developing country from both theoretical and empirical perspectives. If the findings from this study prove to be externally valid (and only replicating the study in another and similar settings will tell) then it offers a theoretically based holistic model to understand factors that affect various facets of eCommerce success. This is a stride in the right direction to building a theory with the power to explain eCommerce and its success in developing countries. A more direct implication of this is that, if we are to understand the emergence and development of eCommerce in developing countries, we must depart from the conventional wisdom of looking into environmental characteristics only and pay attention to internal organizational capabilities and characteristics and their fusion with the external environmental forces. This is the tenet underpinning the interactionism perspective thesis pursued.

One well acknowledged difference between developing and developed countries is the difference in the context that makes the external environment. Following arguments from social-construction, cultural-construction, and appropriate-technology schools of thoughts, such differences have been blamed for problems in the application of technologies and management and administrative models. The study has attempted to incorporate aspects of the external environment that might affect eCommerce in the model. In so doing it contributes towards a better understanding of how the external environment of organizations in developing countries fuses with their internal environment to influence their migration to eCommerce.

eCommerce is an emerging discipline that is not yet marked by its own theories. A question that is of paramount interest to IS and eCommerce researchers is which of the existing theories could be relevant to study eCommerce. The study followed a theoretically eclectic approach drawing on various established theories to develop the model tested in the study. This has helped to check the applicability of the different theories in the context of eCommerce and developing countries. Testing theories in diverse contexts helps to determine their explanatory strength and contributes towards building theories in the context within which the existing theories are tested.

Another contribution to theory lies in the instrument that was developed, rigorously tested and validated. The instrument with an overall reliability of 0.94 represents a progress towards identification, measurement, operationalization and validation of organizational and environmental eReadiness and success of eCommerce adoption, development and benefits with particular relevance to developing countries.

The study also contributed a theory based, firm-level understanding of the eReadiness concept and a holistic evaluation of eCommerce success from adoption to organizational outcomes.

9.4.2 Contributions to Practice

From the perspective of practice, the importance of this study is manifold. It could easily be argued, as most would perhaps agree, that a few studies are coming forward on eCommerce in developing countries. If in fact eCommerce is going to emerge as a global conduit for conducting business, as most aficionados predict it would, it is paramount that the practice of this phenomenon in developing countries be investigated and the factors that affect it understood. On those grounds alone, any investigation shedding light on such an important issue is worthwhile.

The different findings of the study here present powerful examples of the current status of eCommerce and the organizational and external environmental factors that affect its adoption, development and benefits in a developing country- South Africa. The results discussed in the previous chapters could be valuable themes for debate in adopting national policies and regulations to promote the diffusion of eCommerce in developing countries. However, one must also acknowledge the fact that no two developing countries are alike and as a result no country could be a perfect role model for another. Nonetheless, this does not nullify the lessons others might learn from the findings of this study, which basically is a South African example.

In addition, the study offers a framework for organizations in South Africa and elsewhere in developing countries to analyze and manage potential risks that might threaten their migration to eCommerce. It provides a holistic approach to understanding eCommerce challenges through its broad coverage of both internal and external business areas with which organizations need to be concerned. Using the instrument, businesses could reflect inwards to assess their internal organization and outwards to assess the external environment and identify gaps (and potential risks) that (between their current organizational and environmental

preparation and the eCommerce capabilities they desire to attain) might hamper their migration into eCommerce. Such exercises could lead into developing action plans to address the issues identified in the assessment phase. In addition, the tool could also be valuable in retrospectively identifying reasons for eCommerce failures thus facilitating *higher-level (deutero)* organizational learning.

Another practical application for organizations is to evaluate themselves against other partners and competitors. A periodical and longitudinal administration of the instrument, within a particular industry, to a representative cross-section of organizations and publishing the findings from such exercise could enable businesses to assess their relative position and to take the necessary corrective actions. This again facilitates learning from other organizations that have achieved the best practices in the industry. Moreover, such knowledge has obvious benefits for that group of organizations considering or beginning the eCommercizing process and for those other organizations, which are already somewhere in the eCommerce panorama, since it can provide them with an understanding of the generalisability of their experiences. In South Africa, in particular, with more organizations poised to continue investing in eCommerce (Chapter 7), the findings from this study could inform their decisions and enable them to minimize failures.

The instrument and model was developed by paying due consideration to the realities of developing countries. As a result, the model and the supporting instrument provide an important tool for managers in developing countries to understand and evaluate their organization's current position, and possible environmental constraints and to plan future eCommerce positions and progress. The assessment tool can easily be used to identify organizational strengths and weaknesses and environmental opportunities and threats that might help management to concentrate on areas that demonstrate a weak profile.

9.5 AVENUES FOR FUTURE STUDIES

A number of avenues for future research that would enable the accumulation of intellectual capital can be articulated. Perhaps, the most important direction that future research effort should focus upon is to test the model proposed in this study in another research setting. This will definitely facilitate tracking the external validity of the model. Another avenue of research relates to continuing to refine the model and instrument. For example, as mentioned in section 9.3, investigating one particular aspect of eCommerce, such as eTrading, and

assessing how the fusion of eReadiness (internal and external) and features specific to eTrading would affect various facets of eTrading success would be most fruitful.

Another area would be to conduct a detailed examination of the specific variables. It may turn out that some variables might be more meaningful for certain kinds of firms or industries and further insight into these may be highly relevant. For example, most researchers in IT in developing countries in general and eCommerce in particular highlight lack of awareness as one of the chief problems. This study offers a theoretically constructed and sufficiently validated instrument, although not necessarily a final solution, to investigate eCommerce awareness that future studies might want to look into. Outputs from such studies will be crucial for policy makers in designing training and other support and intervention programs to encourage the wider adoption of eCommerce.

A longitudinal study of an organization's eCommerce activity from initial adoption of eCommerce as the organization progresses towards some higher stages of maturity and the dynamics of the eReadiness profile that affect such progress would provide a rich research milieu and a detailed understanding. Recommending a longitudinal study, which is qualitative in nature, after an extensive positivistic research might sound ironic. However as Orlikowski and Baroudi succinctly state in the excerpt quoted at the beginning of Chapter five, all research philosophies offer an insightful perspective on the phenomena of interest and one epistemology cannot be considered as superior over the other.

This study also charts an interesting avenue for eCommerce success research, in particular for those that use "satisfaction" as a dependent variable. So long as researchers use "satisfaction with eCommerce" as a dependent variable for eCommerce success, this study opens a new avenue to the antecedents of satisfaction. The correlation analysis reveals a relationship between the other facets of eCommerce success and satisfaction with eCommerce that future research might want to explore.

9.6 CONCLUDING REMARKS

The potential of eCommerce for developing countries might remain barren academic wishes unless organizations in these countries incorporate eCommerce into their operation. This study, working within an interactionism perspective, attempted to bring a theoretical framework that can explain various facets of eCommerce in developing countries. A model of eReadiness and

eCommerce success is proposed; an instrument to operationalize the model is developed and tested with empirical data from South Africa. One obviously needs further investigation before claiming the external validity of the findings documented here.

Answers to the research questions posed at the beginning of the study are also provided. How the fusion of organizational and environmental factors affect various facets of eCommerce success is discussed and the theoretical and practical implications as well as directions for future research highlighted. In conclusion, it can be argued that the challenge facing organizations and institutions in developing countries as they embark on eCommerce is developing change capabilities. Such capabilities enable organizations not only to build and manage their internal eReadiness but also to shape the external environment in order to successfully exploit the potential of eCommerce as succinctly expressed by Hartman et al (2000) at the beginning of this chapter.

In the wisdom of Darwin, "*it is not the strongest species who survive nor the most intelligent, but the ones most responsive to change*". Larry Ellison continues, "*before you change, you have to admit you have a problem, you have to understand your problem and you have to communicate the problem clearly so that everyone understands why the change is needed. Changing technology is the easy part of becoming an eBusiness. Persuading people to change the way they work- that is the hard part*".

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APPENDICES

APPENDIX I

SOUTH AFRICA'S NATIONAL CONTEXT FOR eCOMMERCE

SOUTH AFRICA'S NATIONAL CONTEXT FOR eCOMMERCE

1 INTRODUCTION

The main purpose of the discussion in this appendix is to provide background information within which the study is conducted and the findings are interpreted. In addition, while discussing the findings of the study, we made frequent references for the reader to reflect on the South African context before generalizing from our finding to other countries. And here we provide that description.

The description starts by providing general background information and proceeds with scanning the institutional, political, socio-economic, ICT and eCommerce environments. At the outset we would like to caution the reader to keep in mind that some macro level indicators hide the apparent imbalances and inequalities within South Africa, which unfortunately follows the contours of color and race. This division is reflected in all of the social and economic development indicators such as income, assets, human capital, unemployment, illiteracy, poverty and access to practically everything (food, water, shelter, education, school, electricity, telephone, medical care, financial service, etc).

2 COUNTRY BACKGROUND

Located in the Southern most tip of Africa, South Africa has a total land area of 1.14 million square kilometres and outlets to both the Atlantic and Indian oceans. Of the total area, only 10% is suitable for agriculture (Mohr et al, 2000). South Africa has the 5th largest population in Africa (about 41million growing at an average rate of 1.5 % per annum). About 50% of the population lives in urban centers, 70% is functionally literate and adult literacy is 85% (Berman, 2001).

According to the World Bank's classification, South Africa is a middle-income developing country. However, because of its historical past, it demonstrates a microcosm of first and third world environments. While some parts of the country show a first world phenomena and a sector of its population leads an equivalent lifestyle, a significant part of the country and the majority of South Africans were legally segregated and excluded from such benefits and hence lead a typical "developing country lifestyle" characterized by "endemic poverty" (Berman, 2001; SAITIS, 2000). Table I.1 provides South Africa's standing in the rest of the world in relation to some of the globally used indices.

Table I.1 South Africa's Global Standing

Index /measure	What it measures	South Africa	Other counties
Economy Size 2000	Gross National income per capita	72nd	United States (3) Togo (92); Sierra Leon (207)
GINI Coefficient	Measures the level of equality and inequality; perfect equality (0) perfect inequality (1)	0.61	
Human Poverty Index 1	Poverty in developing countries	33rd	
Human Development	The overall achievement of a country in terms of longevity, knowledge and decent standard of living	94th	Norway (1); Egypt (105)
Health System Performance	WHO ratings of 191 member countries overall health performance for 2000	175th	
Corruption perception index	Survey of business people, political analysts and the public's perception of corruption	38th	Finland (1), Egypt (54), Bangladesh (91)
Technology Achievement	Creation of technology diffusion of old (telephone, electricity) and recent (internet) innovations	39th	
2000, World competitiveness	Survey of 49 countries on the basis of government finance, technology, infrastructure, and institution	42nd	USA (1), China (33), India (41)
(2000/1) Africa Competitiveness	World Economic Forum rating of African countries based on macroeconomic and political analysis	7th	Tunisia (1), Ethiopia (11), Madagascar (24)
Corporate tax	KPMG surveyed 58 countries' corporate tax rates	37.8%	Global average (33.75%)

(Sources: UNDP , 2002; World Bank, 2001a, 2001b; Berman, 2001)

3 THE POLITICAL AND INSTITUTIONAL ENVIRONMENT SCAN

3.1 Politics

After making a dramatic and relatively peaceful transition from the draconian system of Apartheid to a democracy in 1994, South Africa is currently one of the few countries in Africa with an enviable political stability. The country has a constitutional democracy with a bicameral parliament and an indirectly elected executive president. South Africa's Constitution is claimed to be one of the most progressive in the world (Burger, 2000/1). Legislative and law-making authority is vested in the bicameral parliament while the fully independent judiciary is entrusted with the responsibility of interpreting the law in accordance with the Constitution. The constitution provides for an independent corruption watchdog, the Public Protector, and for independent commissions on human rights, gender equality and the restitution of land rights (Berman, 2001).

3.2 Policy

The main challenges facing present day South Africa, some of which are obviously inherited from the past, are *poverty, inequality, racism, unemployment, economic stagnation, integration into the world economy* and *globalization* (Berman, 2001; Coetzee et al, 2001). Both the current and its immediate predecessor's government policies are then directed at addressing these multi-prong challenges and getting rid of the most prevailing legacies of apartheid. In 1996, the government adopted a macroeconomic policy (alias strategic framework) known as GEAR (Growth, Employment, and Redistribution) (Coetzee et al, 2001).

GEAR commits South Africa to fiscal discipline (through cutting budget deficits), public enterprise reform (via privatization of state assets) and economic liberalization and deregulation (removing of foreign exchange control) (Coetzee et al, 2001; SAITIS, 2000). Its main objectives are to deliver higher rates of economic growth that will eventually lead to the creation of more jobs and eradication of poverty. Although the framework and its outcomes are matters of vehement discussion in South African debates (see Le Roux, 2001), between 1993 and 2000, South Africa's Gross National Income (GNI) in real (1995) terms rose every year at an average rate of 2.5% (Berman, 2001; SARB, 2001). However, the figure is not as high as expected and unfortunately. GEAR does not seem to halt, at least not so far, job losses.

In general, GEAR falls within the *neo-liberal* policies of adherence to free-market principles propagated by the IMF and the World Bank. However, in South Africa, there is still moderate state control, directly or indirectly, of the railways, harbors and airports. Electric power, radio, television and telecommunications services (fixed) are still under public ownership. In some of the sectors (such as fixed telephones) there is the involvement of a strategic partner while others (such as electric power) are completely under state control (SAITIS, 2001). Except in the banking and insurance industries, there are no sector restrictions on foreign investment and foreign ownership of local companies and businesses. South Africa exercises price control systems on limited items related to basic foodstuffs and petroleum products. In an attempt to correct the imbalances created by the years of Apartheid rule, South Africa has also instituted policies related to affirmative action and black economic empowerment.

3.3 Legal Infrastructure

South African law is based on Roman Dutch law as practiced in the Netherlands in the 17th century. However, today, many aspects of South African law are similar to the law of the United Kingdom. Table I.2 provides a summary of some of the business related acts currently in practice.

Table I.2 Examples of South African Business Acts

Area	ACT	Remark
Patents and Inventions	Act 57 of 1978	Patents may be granted for any new inventions capable of being used or applied in trade or industry or agriculture. Patents endure for a period of 20 years from date of application
Trade Marks	Act of 1963	The Act allows for the registration (initially for 10 years but renewable thereafter for an unlimited number of further 10-year periods) of distinctive marks to be used in relation to goods or services.
Copyrights	Copyright Act of 1975	Computer software, literary, musical and artistic works, cinematography films, sound recordings, broadcasts, program-carrying signals and published editorials are all eligible for copyright as long as they are original. Copyright endures for a period of 50 years
Industrial Designs	Designs Act 1967	Any design applied to any article in respect of its pattern, shape or configuration, or ornamentation is protected under this act initially for a period of 5 years but with two additional 5-year extensions.
Know-How and Trade Secrets	Common law	These are protected under the common law principles pertaining to unlawful competition
Competition	Act 89 of 1998	Maintain and promote economic rivalry. In addition it also deals with other aspects of the economy such as levels of employment and increased ownership stakes in the economy.
Consumers affairs (unfair business practices)	Act 71, 1988 amended to Act 23, 1999	Regulates business practices and its effect on consumers and consumer complainants

South Africa is also a signatory to most of the international conventions such as the Convention of Paris for the Protection of Industrial Property; WIPO, TRIPS, the Berne Convention, and the Patent Cooperation Treaty (Jensen, 1999). Legislature is currently in the process of updating some of the acts to conform to the international treaties. In addition, there is legal uncertainty surrounding the enforceability and admission of digital signatures as evidence of online transactions or fraud and the status of email for online contracting (DOC, 1999). Costs of obtaining legal protection, however, tend to be excessive, and unaffordable by the majority of the population and the small to medium enterprises, (DOC, 1999).

Policy and law making in South Africa take a very long and "democratic process" passing through *Discussion, Green and White papers*, *Draft Bill*, *Bill*, *First Reading and Order Paper* before it is signed by the State President and published in the Government Gazette as an *Act*. Each of these stages involves a wide range of discussion and consultation both by the public and the legislature and the whole process will generally take more than two years to complete.

3.4 Public Sector

The organ of government that is responsible for the implementation of policy and delivery is the Department of Public Services and Administration (DPSA). There are over 1 million public servants in at least 11 Public Services. The sector is currently undergoing through transformation. DPSA also hosts the government's chief information officer and is busy, as we will discuss below, initiating eGovernance discussions.

3.5 Unionization

The Congress of South African Trade Unions (COSATU) is one of the most powerful unions in the world (Adler and Webster, 2001). COSATU played a formidable role by leveraging the industrial muscle in the struggle against Apartheid. It also formed an alliance with the current ruling party of South Africa -the African National Congress (ANC). However, presently COSATU is often at odds

with the government and has to navigate between opposing and supporting the ruling party. The main bone of contention between COSATU and the government is the macro-economic framework (GEAR) that the government is following. COSATU considers the policies of *neo-liberalization* as posing fundamental threats to its base (Adler and Webster, 2001; Berman, 2001).

South Africa also follows labor legislation similar to countries such as Sweden and Germany (Le Roux, 2001). Even if GEAR calls for more flexible labor policies, this legislation makes it difficult to hire and fire workers (Adler and Webster, 2001). Therefore, the South African labor environment is characterized by frequent strikes by workers. For example between 1998 and 2000 an estimated 5.9 million man-days are reported to have been lost because of strikes (Berman, 2001). Some blame the strong unionization of the labor and the labor legislation as the factors that adversely affected the attractiveness of South Africa as a destination for foreign direct investment (Le Roux, 2001).

3.6 Government Commitment to ICT

The government of South Africa has recognized the role and importance of IT in dealing with South Africa's chief challenges. There is a recognition and commitment up to the highest level that ICT can make a significant difference in South Africa's effort to achieve global competitiveness and correct the social and economic imbalances created by the previous regime. The government's commitment is reflected through the various initiatives (to be discussed below) that it continues to adopt. In fact, it has been reported that many in the development community look to South Africa for answers of ICT led development (Davison et al, 2000).

4 SOCIO-ECONOMIC SCAN [1]

4.1 Economy

South Africa is a middle-income developing country with a GDP/per capita of 9160 as of 2000 (the World Bank, 2000). Although South Africa's GDP appears to be high compared to some developing countries, approximately 46% of the population is estimated to be living on or below the subsistence level (SAITIS, 2000).

In 2000, South Africa's real GDP grew by 3.1% and its economy by 2.3%. Large enterprises accounted for 65 % of the GDP and 40% of jobs. Medium-sized enterprises accounted for 15% of GDP, small businesses 14% and micro businesses 6%.

In 2001, 62% of South Africa's working force was employed in the formal sector. Although South Africa is rich in terms of some mineral resources, its economy is largely dependent on the service sector. For example, in the year 2000, the primary sector (agriculture, forestry and fishing, mining and quarrying) contributed 10% of the national income; secondary sector (manufacturing, electricity and construction) 24% and the tertiary sector 64% (Business Blue Book, 2002). In the same year, South African exports (206 billion Rand) exceeded its imports of (133 billion Rand) and accounted for 19% of the GDP (Business Blue Book, 2002). The main export items (in 2000) were mineral related such as precious and semiprecious metals. In 2000, South Africa imported mainly chemical and mineral products. South Africa's major trading partners are the United Kingdom, the United States, Germany, and Japan.

Overall, South Africa has the largest and most industrially "developed" economy in Africa, the continent's most "developed" transport and telecommunications systems and it generates some 40% of Africa's electricity output, although 35% of households do not have access to electricity (South African Yearbook, 2000/2001). It also has a comparable world-class financial sector, which was mainly accessible to the privileged few while the majority remain "underbanked" and "underserviced" (Mohr et al, 2001).

[1] *Unless stated otherwise, the statistics figures in this section are extracted from Berman (2001)...*

4.2 Investment

Between 1994 and 1999, foreign direct investment (FDI) grew from 32.55 billion Rand to 318.63 billion Rand. Of the 1999 FDI figure, 77.8% came from the United Kingdom. South Africa's direct investment to the rest of the world also increased from 67.70 billion Rand in 1994 to 203.04 billion Rand in 1999. 87% of the 1999 investment went to Europe with 48% of the total to the UK only.

4.3 Social

One of South Africa's biggest challenges and in a way its *Achilles hill* is its poor performance in terms of the social development indicators (refer also to table I.1) such as poverty, health, education, sanitation, etc. For example in 1999, 52% of South African households (62% in the rural areas) are reported to have experienced hunger and only 25% appeared to have been food secure. However, the South African government is committed to improving the living standards of all South Africans. For example, during the six-year period preceding 2001, the government provided housing for 5 million of its citizens by building some 1.1 million houses. During the same period the government approved over 1.1 million housing subsidies. It has provided water to 6.5 million people. Table I.3 provides a summary of the social indicators, in the sense of the World Bank's use of the term, of South Africa in comparison with the rest of the continent.

Table I.3 Social Indicators

Indicator	What it measures	South Africa	Minimum, maximum and African total
Poverty	Percentage of people below 1 dollar a day	24	Morocco (1); Zambia (85)
Income distribution	Share of income held by the richest 20% of the population	65	South Africa (65)
	Share of income held by the poorest 20% of the population	3	Sierra Leone (1), Egypt (8)
Urbanization	Urban population as % tage of total population	50	Rwanda (6); Libya (86) ; Africa (36)
Death Rate	of deaths	8	Libya (6); Sierra leon (26); Africa (13)
Longevity	Life expectancy at birth in years	65	Sierra Leone (37); Seychelles (71)
Sanitation facilities access	%tage of urban population	78	Congo DR (15); Tunisia (100)
	%tage rural population	12	Angola (4); Tanzania (83)
Access to safe water	%tage of urban population	90	Guinea Bissau (38); Tunisia (100)
	%tage rural population	33	Madagascar (4); Libya (91)
Adult illiteracy	%tage of population >15 and illiterate	16	Zimbabwe (9); Niger (86); Africa (43)
Prevalence of HIV	Percentage of adults (1997)	12.91	Zimbabwe (26); Africa (7)
Unemployment	Percent of people unemployed	37	

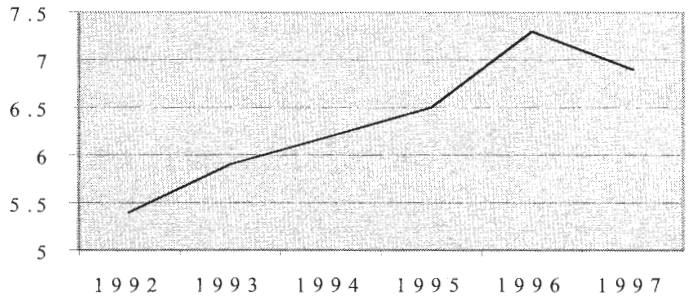
(Source : World Bank, 2001a; 20001b)

5. ICT SCAN [2]

South Africa has a relatively well-developed ICT industry and a sophisticated ICT use culture. However, internal inequality in terms of access to these technologies and the profile of professionals in the ICT sector reflects the injustices of the Apartheid rule. The South African ICT market has experienced a relatively high growth path, both in terms of real value and ratio to the GDP, with annual real growth rates closing to 10%. Figure I.1 shows the growth of the IT/GDP ratio.

[2] Unless stated otherwise, the statistics information in this section are extracted from SAITIS (2000)

Figure I.1 IT/GDP Ratio of South Africa



(Source: SAITIS, 2000)

5.1 Informatization Indicators

South Africa boasts a "well developed" telecommunications network, most of which is in its commercial and urban centers. On the other hand, in remote and rural areas penetration is very low. Table I.4 provides informatization indicators of South Africa compared to some benchmarks.

Table I.4 Informatization Indicators [3]

	Main Tel. Lines	Mobile Phones	Newspapers	Radios	Television sets	Fax Machines	PC	Internet hosts
South Africa	**115**	**37**	**32**	**317**	**125**	**3.5**	**47.6**	**33.4**
All Africa	18			190	59			
Middle Income	145	39	74	401	255	1.9	37.4	13.4
Low Income	16	1		99	57	0.2	2.2	0.10
Upper Income	286	265	286	1286	662	72.3	311.2	607
World Average	**146**	**55**		**418**	**247**	**12.7**	**70.6**	**94.5**

(Source: The Word Bank, 2000a; 2001b)

5.2 ICT in the Household (Access for All)

There are over 5 million fixed private and public phones around the country, making South Africa the largest telecommunications provider in the whole of Africa. In addition, 1.5 million South Africans have access to the Internet from their household personal computer and 6.5 m active users of cellular telephones, comprising 16% of the population

5.3. ICT in Education

One of the damaging effects of Apartheid was the segregation of the school system under what is known as *Bantu education*. As a result, there are enormous differences in terms of access to educational resources in South African schools of all levels where the majority of the previously disadvantage schools are still grappling for basic resources of classrooms and chairs (Miller, 1999)

- Half of the 27000 schools have no electricity, a quarter no running water (Miller, 1999)
- Only about 2000 schools have adequate telephone lines, electricity and computers to complement IT based learning
- Of the 27000 schools, 2241 have computer facilities totaling 34843 between them
- More than 90% of the schools do not have computers
- The *pupil-to-computer* ratio in South African primary public schools is 461:1 (in some of the provinces this figure is 5341:1). In secondary schools, 254:1 (with a low of 1679:1) and technical colleges, 22.3:1 (with a low of 108:1) (Berman, 2001)
- Through UniNet more than 500,000 tertiary students have access to the Internet

[3] All the indicators are per 1000 people and reflect the 1998 status except the Internet hosts, which is per 10,000 people and reflects the 1999 status.

5.4 ICT In The Public Sector

The public administration sector is one of the most extensive users of ICT. It is estimated that in 1998 the sector had 100,000 installed bases of Internet enabled PCs, which represents 10% of the total figure. The government also sanctioned various studies either directly or as part of the broader public sector reform or IT strategy process that investigated the public sector IT utilization. Some of these include the Presidential Review Commission, which also looked into government information management, information systems and technology (IMIST); the SAISIT (South African IT industry base line study) and more recently the Inventory of Government Information System (IGIS) (Kahn and Swanborough, 1999; DPSA, 2000).

The IGIS study estimated that currently government-wide (central and provincial) IT expenditure stands at 3.6 billion Rand including salaries. Of this figure 5% is on Hardware; 16% on Software; 29% on maintenance; 12% on consulting and 38% on development. It also identified a range of problems with government's IT usage. Some of these include duplication, lack of interoperability of systems, skill problems, and lack of coordination of ICT efforts.

The Government also has a State Information Technology Agency (SITA) enacted in 1999 to provide IT related services exclusively to the public service. An eGovernment discussion document has also been drafted and discussions are underway.

5.5 ICT in Business

ICT ingression in the formal sector of the South African business (especially in the finance, services and manufacturing sector) is relatively well advanced. However, it has been reported that there is no comprehensive source of IT users in South Africa (SAITIS, 2000). By the year-end 1998, an estimated 900,000 Internet-enabled personal computers have reported to be installed in all the industries excluding the public sector. There is a growing local business Web presence. E-mail usage is almost becoming the *de-facto* business communication method for the vast majority of large, medium and small businesses in the formal sector.

The SAITIS (2000) report claims a lack of publicly available data on the effectiveness of IT use by South African businesses.

> *" There is clearly lack of publicly available data on users of IT in South Africa.... Even more difficult to ascertain is how, and how well South African enterprises are using Their IT facilities. This is even more important than the basic statistics, because it indicates the focus and extent to which these enterprises are meeting the challenge of globalization."*

5.6 The ICT Industry

South Africa has a relatively diversified and developed ICT industry compared to the rest of Africa. The ICT industry has shown a growth of 15% in 1994-5; 9%, 1996-7 (Miller, 1999). However, One trend that can be observed in the South African ICT industry is that despite the global trend, which is dominated by software and professional services, hardware still constitutes the largest proportion, accounting for as much as 60% of the total market revenue.

Within the software and professional services categories, the strongest performing market segment is packaged software, which accounts for as much as 70-80% of the total revenues in the sub sector. For example, in 1998, imported and redistributed software accounted for more than 92% of the total revenue from the software market and almost all of the revenue from the application development tools market. The industry is limited to reworking, customizing and local integration of internationally designed packages. However, 3% of the 1995 software revenue was generated from exporting mainly imported packages and a limited amount of locally produced software. This trend shows South Africa's obvious dependence on imported ICT and the infancy of its own indigenous industry

In terms of IT hardware, more than 95% of revenues by local distributors are from imported products and components. As a result, rather than a component manufacturing industry, the PC assembly industry has flourished. Such indigenous capability has however allowed South Africa to export its locally assembled personal computers to the rest of the continent, which in 1995 accounted for 35% of the total export in the sector. Due to earlier policies directed at encouraging local production and market guarantee of locally produced products, the South African telecommunications equipment industry has a better performance and skill base with imports in a non-cellular sector accounting for under 40% of the industry revenue in 1995. Table I.4 summarizes the IT spending of the South African ICT industry and Table I.5 indicates the number and distribution of ICT related companies.

Table I.5 IT Spend in South African IT Industry (in millions of USD)

	IT spend					
	1992	1993	1994	1995	1996	1997
IT Hardware	1227	1321	1558	1525	1631	1717
IT Software	287	330	386	456	633	669
IT Services	876	938	1100	997	1202	1472
Office Equipment	131	138	170	158	148	155
Internal Operation	1212	1295	1328	1446	1485	1526
Telecommunications	2666	12847	3023	4068	4185	4149
Total IT Spend	6400	6869	7564	8649	9283	9690

(Source: SAITIS, 2000)

Table I.6 ICT Players in South Africa

Sector	Number of operators	Major Players
Fixed Wire Telephony	1	Telkom
Cellular	2	MTN, Vodacom, Cell C
Paging	23	Radiospoor, Autopage and Paging Plus
VANS	25	EDS Africa, Firstnet
Radio Tranking	3	Fleetnet,Q-Trunk
Satellite	4	Orbicom, Sentech
Internet	60	Internet Solution, UUNet, GIA, Mweb, Intekom, SAIX
Wireless? Data	2	Swiftnet, WBS
JSE Listed ICT Related Companies		
Electronic and electrical		9722
Information Technology		56280
Telecommunications		2729

(Source : BMI-T, 2000; SAIST, 2000)

5.7 ICT Skills

South Africa's skill base in the ICT and related technical areas is very limited. For example, in 1998/99 it was estimated that more than 25,000 professionals were involved in the 500+ software companies in India and annual output from India's educational and training institutes was approximately 5000. Compare this with the total number of 964 professionals employed in the IT industry; total output of 2016 diploma and degrees awarded by South African territory institutions in computer science, data processing and electrical engineering in 1996 and the 28,671 computer related positions in the entire South Africa (SAITIS, 2000). Without going into detail this shows South Africa's challenge in this area. Moreover, the distribution of ICT skill is one of the areas where the inequity of the past legacy is very prominent.

In addition South Africa is also facing an increasing level of emigration while the number of immigrants is decreasing. Between 1990 and 2000 the number of emigrants increased from 4722 to

11309 while during the same period the number of immigrants decreased from 14499 to 3053 (Berman, 2001). According to the SAITIS report, the majority of the emigrants are engineers and managerial personnel. In addition, of the 34 countries rated by the World Competitiveness Report in terms of the likelihood of the well-educated labor to stay in the country, South Africa Ranked 33rd. This indicates the severity of the problem.

Although there is no information specific to IT professionals, it is believed that an increasing number of IT professionals are leaving the country (SAITIS, 2000).

5.8 ICT Initiatives

There are a number of initiatives by the government, the private sector, civic organizations, NGOs and international agencies to boost the ICT situation in South Africa. In addition, while some of the initiatives are national in focus others have regional and global emphasis. Within the government department only, there are three departments undertaking various initiatives and there appears to be lack of coordination. The initiatives are focused at improving connectivity at all levels, developing the human resource base for ICT, furnishing government and industry with baseline information, etc.

At the moment, the Department of Education, Department of Communications, Department of Arts, Culture, Science and Technology, Department of Trade and Industry, and the Department of Public Service Administration are all involved in running ICT related projects of macro-economic significance. Local government also play their own role in this process.

Table I.6 summarizes some of the widely known initiatives. It has to be noted that the categories are our own creation and classificatory in nature. In addition, some of the initiatives cover a number of areas. In addition the initiatives are summarized for descriptive purposes and we do not intend to go into the details of evaluating the state and status of each of the initiatives listed. Obviously doing so requires a separate study on its own accord.

Table I.7 Samples of ICT related Initiatives in South Africa

POLICIY/LEGISLATIVE/MACRO Plans	
Telecommunications Act 1996	Promulgate an act to phase out telecom monopoly until 2003; telecom responsible for installing 2.8 million lines in previously under-serviced areas
Universal Service Agency (USA) 1997, www.usa.org.za	A statutory body established by the telecommunications act, responsible for ensuring universal access to all telecommunications services (voice, fax, internet, etc..)
May 1998	Department of communication mandated to establish an information technology investment cluster. Objective is to develop coherent legislation on information society
STUDIES (Assessments)	
The Foresight Project, 1998	A scenario planning exercise launched by the department of Arts, Culture, Science and Technology that will identify the sectors, technologies and trends to improve the quality of life of all South Africans over 10-20 years. The IT working group conducted both an international trend and local ICT status studies and ICT SWOT analysis.
SAITIS 2000 www.saitis.co.za	A based line study commissioned by the department of Trade and Industry (DTI) and supported by the Canadian International Development Agency. Focus on assessing the status of the IT Industry and the status of IT related Jobs and Skills.
The Presidential Review Commission (1998)	Also looked at government's information management, information system and technology (IMIST)
IGIS, 2000	A project launched to assess the state of IT in the government by the department of Public Service Administration
Connectivity (ACCESS FOR ALL)	
Infocom 2025	The Government's plan with the aim of providing every citizen with

	cheap Internet access at public kiosks, using a pre-paid card. It also aims at improving government efficiency. The department of Communication is responsible for this.
Multi Purpose Community Telecenters (MPTCs)	Designed to increase access to the previously disadvantaged people. The USA is responsible for rolling out MPPTCs
Internet 2000/ SchoolNet SA, 1997	Bringing Internet connection to schools A national NGO (based on Public Private Partnership) working to develop Internet use in schools
Public Information Terminals (PIT)	A project intended to provide access in public places like schools, post offices, to eMail, eCommerce and local government services
Human Resource Development	
South African Qualification Authority (SAQA) Act, 1995 www.saqa.org.za	Promulgated by Act 58 of 1995, SAQA is responsible for creating the National Qualifications Framework
Technology and Human Resource for Industry Program (THRIP) 1991	THRIP supports the development of technology and appropriately skilled people for industry to improve South Africa's global competitiveness.
Institute of Software Applications and Knowledge (ISAK)	is an academy established by the Department of Communications to train IT professionals
Technology Enhanced learning Initiative (TELI)	TELI, sponsored by the Department of Education focuses on the introduction and use of technologies effectively in South African education and training.
Telecom center of excellence (TOC), 1996	The national telephone operator's initiative to develop national expertise in the design, development and use of ICT infrastructure and software with special emphasis to the previously disadvantaged community
EducationNet	A distance education Network, which is also part of World Bank's human development Networks knowledge management system.
For a comprehensive list of initiatives refer to www.saitis.co.za	

(Source:SAITIS, 2000)

6 eCOMMERCE SCAN

In Scanning the ICT situation in South Africa, we have not made direct reference to eCommerce. The discussion thus far provides the South African national context within which this study was conducted. In this section we will provide a brief summary of the overall eCommerce related initiatives in South Africa.

6.1 South African Definition of eCommerce

The following definition of eCommerce is taken from the eCommerce *Green Paper,* the first of the many papers in the eCommerce policy formulation process. This definition reflects the government's understanding and policy direction on eCommerce.

> *ECommerce is the use of electronic networks to exchange information, products, services, and payments for commercial and communication purposes between individuals consumers, and businesses, between businesses themselves, between individuals themselves, within government or between the public and government and between business and government (DOC, 2001)*

Note that according to the South African definition of eCommerce even telephone conversations can be deemed as eCommerce.

The main benefit envisaged form eCommerce include:

> "*improved response time, improved competitive positioning, ease of concluding deals and financial transactions, extending global market reach, increased revenue potential, increased consumer convenience and choice, reduced competitive prices, improved and convenient customer service* (DOC, 20001)

Again note that while the definition treats the intragovernment, intergovernmental and government to business and government to citizen activities as eCommerce the envisaged benefits do not reflect the benefits from government's eCommerce engagements.

6.2 eCommerce in South Africa

eCommerce appears to be widely embraced in South Africa. BMI-Techknowlege (2001) estimates that spending on eCommerce will reach at least R2, 5 billion in 2002. However, the inequitable access and distribution of infrastructure and services throughout the country is likely to hamper eCommerce opportunities and limit its growth.

Although South Africa has most eCommerce facilities such as banking systems, non cash payments (Master Card and VISA ATMs), computers, telecommunications, and postal and courier services, these services are mainly concentrated around urban centers, and only available to a tiny segment of the population that can afford them (DOC, 1999). Government and large business initiatives aim to extend these services to more remote parts of the country.

At present, South Africa has no specific eCommerce legislation in place. No South African court has yet dealt with legal problems arising around eCommerce. Electronic transactions have been interpreted within existing traditional common law principles, but courts have been willing to refer to precedent in foreign jurisdictions and, in limited instances, to reason through analogy.

South Africa also faces the universal need to secure dispersed networks against unauthorized access and fraud. Digital encryption is a simple and relatively cheap solution as is cryptography. However, this solution has not been broadly and universally adopted in South Africa. On the other hand, these solutions would appear to conflict with current legislation such as the *Interception and Monitoring Prohibition Act of 1992*. Pressing policy considerations require government to balance the need for greater public confidence in e-commerce with the requirements of law enforcement agencies to have access to public databases, (DOC, 1999).

6.3 South Africa's E-Readiness Ratings [4]

So far, South Africa has been assessed Seven times for e-readiness (See Appendix 3B). Following is a summary of the results from some of the publicly available assessments.

Table I.8 South Africa's e-readiness Ranking

	South Africa	Comparisons
MI (McConnel and WITSA)	South Africa's connectivity, human capital and e-business climate have been rated "red", requiring substantial improvement in order to support e-business and e-government. South Africa also needs to improve its e-leadership and information security.	In all of the criteria used by MI, the African countries such as Nigeria, Senegal, Moroco, Kenya, Egypt (excepting e-Leadership) have also received a "red" rating.
IDC	South Africa, with a rank of 38 out of 55 countries is grouped among the "Strider" countries, countries that are moving purposefully into the information age, with much of the necessary infrastructure in place	Malaysia (32), Chile (33), Costa Rica (36) are in the same group with South Africa. Egypt (51), China (52), India (54), Pakistan (55) are categorized as countries that are moving ahead inconsistently because of financial limitations vis-à-vis their population

[4] For the description of the criteria, refer to Appendix 3A

EIU (Economic Intelligence Unit)	South Africa, with a rank of 35 out of 60 countries are classified among the eCommerce followers category. EIU defines countries in e-business followers category as having started to create an environment conducive to e-business but have a great deal of work still to do	Saudi Arabia (44); Egypt (40); Chile(29); Malaysia (33) are some of the countries in the e-business followers group. China (49); Algeria (54); Nigeria (56) Pakistan (60) are amongst the e-business laggards, countries risking being left behind.
CID/HU www.cid.harvard.edu/cr/profiles.html	South Africa is Ranked 40th out of 75 countries with network use component and enabling factors index both at 41. Social capital, ICT opportunities and information infrastructure network access are areas where South Africa scored lowest.	Nigeria (75), Chile (34), China (70), Egypt (60), India (54); Zimbabwe (70).
M-N (Metric-Net)e-economy index. www.metricnet.com/specials/GNEImain.html	On the transformation to the digital economy index which measures internet users, electronic commerce, investment in telecommunications, computers per capita, and computer power per capita South Africa Ranked 23rd.	Chile (31); China (26); India (46)

6.4 Government eCommerce Initiative

The most notable government initiatives regarding eCommerce in South Africa is related to the process of policy formulation that is currently underway. Spearheaded by the Department of Communications, a discussion document that formed the basis for the eCommerce debate in South Africa (www.ecomm-debate.co.za) has been prepared and was released in June 1999. After extensive consultation and inputs from various sections of the society, the *Green Paper* has been published and submitted to the public such as to persons *knowledgeable in the area, individuals and enterprises that use eCommerce and learners* for further input.

As stated in the *Green Paper*, the underlying principles governing the development of eCommerce policy in South Africa include i*mproving quality of life, ensuring international consistency, being consultative, being flexible, ensuring technological-neutrality, supporting private sector initiatives, establishing public/private partnerships and promoting SMEs*

The *Green Paper* poses a number questions that are grouped into four main themes: *legal and regulatory issues, building trust, enhancing the information communication infrastructure, and maximizing benefits*

As mentioned earlier, the policy making process in South Africa takes a long period of time. *The Green Paper* is one of the early outputs in the whole process and it might take some time before South Africa establishes an eCommerce Policy. At the time of writing this thesis, feedback has been collected on the Green Paper and the White paper is expected to be launched soon.

7. SUMMARY

This appendix is presented in the interest of providing the reader with the background information within which the study was conducted. It is not by any means comprehensive. The research model proposed and tested in this study enables to capture some of the impacts of the national context described herein. As a result, except for providing a description of the variables that shape the South African context as factually as possible we have not attempted to provide a detailed discussion of how the components of the environment described here affect our findings. However, we believe that from the context described here readers and other researchers would be able to have a better and rich understanding of the context within which this study was conducted.

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Department of Communications www.doc.gov.za
Department of Trade and Industry www.dti.gov.za
Department of Public Service and Administration www.dpsa.org

[5] Only references not included in the main reference are listed here

APPENDIX THREE

E-Readiness Assessments and Tools

Appendix 3A Description of Existing e-readiness Assessment Tools and Studies with National Focus

Author	e-Readiness Conceptualization /Source	Description
	QUESTIONNAIRE/SURVEY	
APEC (Asian Pacific Economic Cooperation)	A country that is 'ready' for e-commerce has free trade, industry self-regulation, ease of exports, and compliance with international standards and trade agreements.The assessment tool can be found at http://www.ecommerce.gov/apec	These assessments gauge a country's readiness for e-commerce through a detailed questionnaire. Assessment include **basic infrastructure and technology** (speed, pricing, access, market competition, industry standards, foreign investment), **access to network services** (bandwidth, industry diversity, export controls, credit card regulation), **use of the Internet** (use in business, government, homes), **promotion and facilitation** (industry led standards), **skills and human resources** (ICT education, workforce), and **positioning for the digital economy** (taxes and tariffs, industry self-regulation, government regulations, consumer trust).
CID/HU (The Center for International Development at Harvard and IBM)	An 'e-ready' society is one that has the necessary physical infrastructure; integrated current ICTs throughout businesses, communities and the government, telecommunications competition; independent regulation with a commitment to universal access; and no limits on trade or foreign investment. http://www.cid.harvard.edu/ciditg	This guide measures 19 different categories, covering the availability, speed, and quality of **network access**, **network learning** use of ICTs in schools, network **society** use of ICTs in workplace, economy, government, and everyday life, **network economy,** ICT employment opportunities, eCommerce, eGovernmnet and **network policy ,** ICT policy (telecommunications and trade), ICT training programs, and diversity of organizations and relevant content online.
CIDIF	http://www.cidif.org/diffusion	Centre International pour le Dévelopement de l'Inforoute en Français - A French adaptation of Mosaic's Questionnaire (see "MQ")
CSPP (Computer Systems Policy Project)	An 'e-ready' community has high-speed access in a competitive market; with constant access and application of ICTs in schools, government offices, businesses, healthcare facilities and homes; user privacy and online security; and favorable government policies http://206.183.2.91/projects/readiness/	Designed to help individuals and communities determine how prepared they are to participate in the "Networked World.". Assessments rate communities along four progressive stages of development for each of the five categories, focusing on infrastructure **access, applications and services, economy; and "enablers" (policy, privacy, security, ubiquity).**
EIU The Economist Intelligence Unit)	http://www.ebusinessforum.com/index.asp	Gauges countries **"e-business environment"** and network **"connectivity"** with two 1-10 statistics, based on "70 different indicators such as the **strength of the economy**, the **outlook for political stability**, the **regulatory climate, taxation policies and openness to trade and investment**."
IDC (World Times /	http://www.worldpaper.com/2001/jan01/ISI/2001%2	Statistical ranking of 55 countries based on 23 indicators of **usages of PCs, the Internet,**

IDC's Information Society Index)	0Information%20Society%20Ranking.html	**and non-computer information technologies** (radio, TV), in government, business, homes, and schools. Also includes variables on basic school enrolment and civil liberties.
KAM (World Bank, Knowledge Assessment Matrix	http://www1.worldbank.org/gdln/kam.htm	A very detailed statistical assessment of country's preparedness for information economy and society using 61 metrics on the **economic and institutional regime**, **educated and skilled population**, **dynamic information infrastructure**, and an **efficient innovation system** of firms, research centers, universities, consultants
MI (McConnell International and WITSA (World IT Services Alliances	An 'e-ready' country has extensive usage of computers in schools, businesses, government, and homes; affordable reliable access in a competitive market; free trade; skilled workforces and training in schools; a culture of creativity; government-business partnerships; transparency and stability in government and an evenly enforced legal system; secure networks and personal privacy; http://www.mcconnellinternational.com/ereadiness/default.cfm	It assesses **connectivity, e-leadership, information security human capital** (ICT education, available skilled workforce), and **e-business climate** (competition, political and financial stability, foreign investment, financial infrastructure). Countries are rated in the five categories on a scale of one to three ('blue,' 'amber,' 'red'), and analysis and recommendations are given
M-N (Metric-Net E-Economy Index)	http://www.metricnet.com/specials/GNEImain.html	Statistics on country's technological sophistication and strength using metrics of **knowledge jobs**, **globalization**, **economic dynamism and competition**, **transformation to a digital economy** and **technological innovation capacity**
MQ (Mosaic)	The framework does not describe an 'e-ready' society *per se*, but the reasons behind and readiness for growth of Internet infrastructure and usage (which are, by most accounts, requirements of an e-ready society). http://som.csudh.edu/fac/lpress/gdiff/	A questionnaire based assessment by Mosaic, much less detailed than their case studies but covering the same issues (**pervasiveness, geographic dispersion, usage within the economy, technology infrastructure, the Internet service market, and sophistication of use**).
NRI (CID/HU and World Economic Forum,	Same as CID/HU http://www.cid.harvard.edu/cr/gitrr_030202.html	In the book "The Global Information Technology Report 2001-2002: Readiness for the Networked World" This recent book provides two-page "country profiles" for 75 countries, which include the NRI ranking (based on network usage, access, policy, economy, and society), and a summary of key IT issues in the country.
CASE STUDIES		
CDGD (Country Development Gateway Projects of the World Bank Development Gateway	www.developmentgateway.org,www.developmentgateway.org/node/137849/cs-docs?d_id=1	As part of the Development Gateway project, focused country-gateways are being commissioned. Each gateway is expected to perform a basic e-readiness assessment, using a modified version of CID's assessment methodology (19 categories, focusing on technology infrastructure, pervasiveness of technology, and the regulatory and business environment.).

CIDCM (University of Maryland, Center for International Development and Conflict Management)	An 'e-ready' society has an ISP market that has passed through three phases of development: (1) pre-commercial (access limited to a pioneer community), (2) commercial (access is sold to consumers), and (3) competitive (the ISP market has multiple competing actors). http://www.bsos.umd.edu/cidcm/projects/leland.htm	The method gauges four types information for each country: **Background and history**, **key players in Internet development**, **Internet development and ICT policy over time, and negotiations** between players in developing the country's Internet. 'Negotiation' between players is the focus of the framework.
InfoDev, World Bank	http://www.infodev.org/ereadiness/index.htm	Detailed case study of Egypt; many more are pending (see Website).
(ITU International Telecommunications Union's)	http://www.itu.int/ITU-D/ict/cs/	Extremely detailed case studies of ICT infrastructure, ICT usage, legal and regulatory framework, and macro economic and local business environment in the target country. Includes statistical ranking based on Mosaic's methodology, and extensive recommendations.
MOSAIC The Mosaic Group	http://mosaic.unomaha.edu/gdi.html	Detailed case studies of the state of the Internet within a country at a particular point in time, measuring pervasiveness, geographic dispersion, usage within the economy, technology infrastructure, the Internet service market, and sophistication of use.
SIDA (Swedish International Development Cooperation) Agency	English Survey reports can be found at http://www.sida.se/Sida/jsp/Crosslink.jsp?d=321&a=9481).	Detailed case studies of ICT infrastructure, usage, human resources, and the legal and regulatory framework in given countries. Contains a focused account of the ICT sector, and recommended actions to improve ICT usage.
USAID (U.S. Agency for International Development)	Central and Eastern Europe reports are easily available at: http://www.usaid.gov/regions/europe_eurasia/eeresources.html#IT Other reports can be found through: http://www.usaid.gov/regions/	Detailed case studies of countries using a framework of "Pipes (Access), Public Sector (Government Policies, E-Government), Private Sector (Usage), People (Training), and existing development Programs", with detailed action plans for countries to pursue in the future.

Appendix 3B Summary of e-readiness Assessments Undertaken Thus Far

		COUNTRIES	NO OF ASSESSMENTS	ASSESSMENT METHOD*		
				CASE STUDY	QUESTIONNAIRE	STATISTICAL
DEVELOPING	AFRICA	Egypt	9	ITU, USAID	CIDIF, MQ	EIU, IDC, KAM, MI, NRI
		South Africa	7	CIDCM		EIU, IDC, KAM, MI, NRI, M-N
		Algeria, Mauritius, Morocco, Nigeria, Tanzania, Tunisia,	4	CDG, USAID, OTHER, Sida,	CIDIF, MQ	EIU, KAM, NRI, MI
		Benin, Cameroon, Ghana, Kenya, Madagascar, Mozambique, Rwanda, Senegal, Uganda, Zimbabwe	3	CIDCM, CID, Sida, ITU	CIDIF, MQ	KAM, MI, IDC
		Burkina Faso, Guinea, Ivory Coast, Namibia	2	CDG	CIDIF, MQ	KAM
		Botswana, Chad, Djibouti, DRC, Eritrea, Ethiopia, Gabon, Mali, Mauritania, Niger,	1		CIDIF, MQ	KAM
		Angola, Burundi, Cape Verde Islands, Central African Republic, Comoros, Congo, Equitorial Guinea, Gambia, Guinea-Bissau, Lesotho, Liberia, Libyan Arab Jamahiriya, Malawi, Mayotte, Reunion, Sao Tome and Principe, Seychelles, Sierra Leone, Somalia, St. Helena, Sudan, Swaziland, Togo, Zambia	0			
	ASIA	India, Thailand , China	10	CDG, CID, Mosaic, USAID	MQ, APEC	EIU, IDC, KAM, MI, NRI, M-N
		Indonesia, Philippines	9	CDG, ITU, USAID, CID		EIU, IDC, KAM, MI, M-N, NRI
		Vietnam	8	ITU, USAID	CIDIF, MQ, EIU, MQ	KAM, NRI
		Bangladesh, Pakistan	7	CID, Mosaic, USAID, CDG	MQ	KAM, MI, NRI, IDC, M-N
		Malaysia, South Korea, Sri Lanka	6	USAID	MQ	IDC, KAM, MI, M-N, NRI, EIU
		Nepal	4	ITU, USAID	MQ	MI
		Cambodia, Mongolia	3	ITU, USAID, CDG	CIDIF	KAM
		Bhutan, Laos, Solomon Island	1		CIDIF, MQ	KAM
		Afghanistan, American Samoa, Christmas Island, Fiji, Kiribati, Maldives, Marshall Islands, Micronesia, Myanmar (Burma), Nauru, Niue, North Korea, Papua New Guinea, Pitcairn, Samoa, Tokelau, Tonga, Tuvalu, Vanuatu, Wake Island, Wallis and Futuna	0			
	EUROPE	Romania, Russia	8	CDG, CID, USAID	CIDIF,	EIU, KAM, MI, NRI, IDC, M-N
		Bulgaria, Czech Republic, Hungary	7	ITU	MQ	EIU, IDC, KAM, MI, NRI, M-N
		Poland	6			EIU, IDC, KAM, MI, M-N, NRI
		Slovakia, Ukraine	5	CDG	MQ	EIU, KAM, MI, NRI
		Armenia, Estonia, Uzbekistan	4	CDG, CID, USAID, OTHER	MQ	KAM, MI, NRI
		Azerbaijan, Croatia, Kazakhstan, Latvia, Lithuania	3	CDG, CID, USAID	MQ	EIU, KAM, MI, NRI
		Belarus, Bosnia/Herzegovina, Georgia, Turkmenistan	2	Mosiac, CDG	MQ	KAM, MI
		Kyrgyzstan, Moldova	1	CDG		
		Albania, Macedonia, Serbia/Montenegro, Tajikistan	0			
	MIDDLE EAST	Turkey	7	Mosaic		EIU, IDC, KAM, MI, M-N, NRI
		Saudi Arabia	6	Mosaic	MQ	EIU, IDC, KAM, MI
		Jordan	5	Mosaic, USAID		IDC, KAM, NRI
		Iran	4	Mosaic	MQ	EIU, KAM
		Bahrain, Palestine, Yemen	3	Mosaic, CDG, USAID	MQ	KAM
		Iraq, Lebanon, Oman	2	Mosaic, USAID	MQ	MI
		Syria	1			KAM
		Cyprus*	0			
	AMERICA	Peru	8	CID	MQ, APEC	KAM, EIU, IDC, MI, NRI
		Argentina, Brazil, Chile, Colombia, Mexico, Venezuela	7	CID	MQ	EIU, IDC, KAM, MI, M-N, NRI
		Ecuador	6	CID		EIU, IDC, KAM, MI, NRI
		Bolivia	5	CID, ITU		KAM, MI,NRI
		Costa Rica	4			IDC, KAM, MI, NRI
		Dominican Republic, Jamaica, Panama	3	USAID	MQ	KAM, NRI, IDC, MI
		Cuba, El Salvador, Haiti, Nicaragua, Paraguay	2	Mosaic USAID	MQ, CIDIF	KAM, NRI
		Barbados, Guatemala, Guyana, Honduras, Trinidad	1		MQ	KAM, NRI
		Antingua and Barbuda, Belize, Bermuda, Falkland Islands, French Guiana, Grenadines, St. Vincent, Suriname	0			
	ASIA	Japan, Singapore, Taiwan	7	Mosaic, ITU	APEC, CSPP	EIU, IDC, KAM, M-N, NRI, MI
		Australia, New Zealand	5			EIU, IDC, KAM ,M-N, NRI
		Brunei Dasussalam, French Polynesia, Guam, Macao, New Caledonia, Northern Mariana Islands	0			
	EUROPE	Finland, France, Italy, Spain, United Kingdom	6	Mosaic	MQ, CIDIF, MQ	EIU, IDC KAM, NRI, MI, M-N
		Austria, Belgium, Ireland, Netherlands, Norway, Portugal, Sweden, Switzerland	5		CIDIF	EIU, IDC, KAM, NRI, M-N, MI
		Slovenia, Denmark, Germany, Greece	4		CIDIF	KAM, MI,M-N, NRI, EIU, IDC
		Iceland, Luxembourg	2			
		Liechtenstein, Moneco	0			
	MIDDLE EAST	Israel, United Arab Emirates	3	Mosaic	MQ	EIU, IDC, M-N, NRI, KAM, MI
		Kuwait, Qatar	3	Mosaic	MQ	KAM
		Cyprus	0			
	AMERICA	Canada	7		MQ, CIDIF	EIU, IDC, KAM, M-N, NRI
		USA	5			EIU, IDC, KAM, M-N, NRI
		Bahamas, Cayman Islands	0			

SOURCE: WWW.BRIDGES.ORG [Accessed April 2002]

*For the full description of the accronyms and the tools refer to Appendix 3A

APPENDIX FIVE

Instrument Development

APPENDIX 5A Final Instrument Used in Data collection

PART I: GENERAL QUESTIONS

Please respond to all the questions by putting a tick mark (✓) at the choice that best describes your organization

1. Your Position in this organization
   - O Managing Director/General Manager/ CEO
   - O Deputy Managing Director/Deputy General manager
   - O Department Manager, Please indicate your department _____
   - O Other, Please specify your position _____

2. How old is your company?
   - O Less than 11 years
   - O 11 to 20 years
   - O 21 to 30 years
   - O More than 30 years

3. Which one best describes your company's primary sector?
   - O Agriculture, forestry and fishing
   - O Construction
   - O Electronics /computers/communications
   - O Financial services/ real estate
   - O Manufacturing (non electronics & computers)
   - O Media/marketing/consulting
   - O Mining
   - O Retail
   - O Transportation
   - O Tourism & entertainment
   - O Wholesale
   - O Others (Please Specify) _____

4. Number of Employees
   - O Less than 50
   - O 51 to 100
   - O 101 to 200
   - O More than 201

5. Annual Revenue in Rands for the year 2000
   - O Less than R 11 million
   - O 11 to 20 million
   - O 21 to 30 million
   - O 31 to 40 million
   - O 41 to 50 million
   - O More than 51 million

6. Which one of the following **best** describes your e-commerce status as of each of the following dates: July, 1999; July, 2001 and predicted for two years from now to July 2003. **For each of the time period, please choose only one of the categories**.

E-commerce Status	July, 1999	July, 2001	July, 2003
1. Not connected to the internet, no e-mail			
2. Connected to the internet with e-mail but no web site			
3. Static Web, that is publishing basic company information on the web without any interactivity			
4. Interactive web presence, that is accepting queries, e-mail; and form entry from users			
5. Transactive web, that is online selling and purchasing of products and services including customer service			
6. Integrated web, that is the web site is integrated with suppliers, customers and other back office systems allowing most of the business transactions to be conducted electronically			

7. When does your company **expect to have the following e-commerce capabilities**? For **each of the items** please indicate by putting **a tick (✓)** mark on the appropriate column.

	Have it now	Within 3 years	In more than 3 years	Do Not Know
1. A local Area Network				
2. Company access to the Internet on a dial-up line				
3. Company access to the Internet on a dedicated or leased line				
4. Non Internet based e-mail				
5. A Website				
6. Registered domain name				
7. Enterprise Resource Planning				
8. Customer Relationship Management (CRM)				
9. Supplier Relationship Management (SRM)				
10. Partners Relationship Management (PRM)				
11. Intranet				
12. Extranet				
13. Electronic document interchange				
14. Firewa!ls				
15. Call Center				
16. Customers payment by credit card				
17. Electronic Funds Transfer (EFT)				
18. Digital signatures				
19. Secured Electronic Transaction				
20. Others (Please specify)				

8. When does your company expect to perform (at least partially) the following business functions **electronically using Internet based networks?**

	Perform now	Within 3 years	In more than 3 years	Do Not Know
1. Publishing Company Information on a Website				
2. Communicating with consumers				
3. Communicating with partners				
4. Internal communication				
5. Product development				
6. Market research				
7. Competitive intelligence				
8. Advertising				
9. Selling products and services				
10. Receiving customer orders through your Website				
11. Providing customer service on the Internet				
12. Receiving Customer payment through the Internet				
13. Placing orders with suppliers over the Internet				
14. Making payments to suppliers over the Internet				
15. Human resources				
16. Telecommuting				
17. Others (Please Specify)				

PART II[1]

While responding to the questions in this part, as much as possible, please try to provide the views of your organization as a whole.

9. Please indicate to what extent **the views in your organization** agree or disagree with each of the following statements by placing a tick mark on the appropriate column circle (1, 2, 3, 4, or 5)

	Strongly Agree				**Strongly Disagree**
	1	**2**	**3**	**4**	**5**
A1. Our business considers that e-commerce is a North American trend not yet applicable to our environment	○	○	○	○	○
A2. Our organization is aware of e-commerce implementations of our partner organizations	○	○	○	○	○
A3. Our organization is aware of our competitors e-commerce and e-business implementations	○	○	○	○	○
A4. Our business recognizes the opportunities and threats enabled by e-commerce	○	○	○	○	○
A5. Our organization understands e-commerce business models that can be applicable to our business	○	○	○	○	○
A7. We understand the potential benefits of e-commerce to our business	○	○	○	○	○
A8. Our organization believes that the gain from e-commerce outweighs its cost	○	○	○	○	○
A9. Our organization has thought about whether or not e-commerce has impacts on the way business is to be conducted in our industry	○	○	○	○	○
A10. Our organization has considered whether or not businesses in our industry that fail to adopt e-commerce and e-business would be at a competitive disadvantage	○	○	○	○	○
A11. In general our business has adequate awareness to practice e-commerce	○	○	○	○	○

10. Please indicate the degree of your agreement or disagreement with each of the following statements by placing a tick mark on the appropriate column circle (1, 2, 3, 4 or 5).

	Strongly Agree				**Strongly Disagree**
	1	**2**	**3**	**4**	**5**
R1. Most of our employees are computer literate	○	○	○	○	○
R2. Most of our employees have **unrestricted access to computers**	○	○	○	○	○
R3. Most of our employees have **unrestricted Internet access**	○	○	○	○	○
R4. We have created a clearly defined e-commerce career paths within our organization	○	○	○	○	○
R5. Our business has the necessary technical, managerial and other skills to implement e-commerce	○	○	○	○	○
R6. Our people are open and trusting with one another	○	○	○	○	○
R7. Communication is very open in our organization	○	○	○	○	○
R8. Our organization exhibits a culture of enterprise wide information sharing	○	○	○	○	○
R9. We have a policy that encourages grass roots e-commerce initiatives	○	○	○	○	○
R10. We are aggressive in experimenting with new technologies	○	○	○	○	○
R11. Failure can be tolerated in our organization	○	○	○	○	○
R12. Our organization is capable of dealing with rapid changes	○	○	○	○	○
R13. We have strong relationships with our suppliers and customers	○	○	○	○	○
R14. We have sufficient experience with network based applications	○	○	○	○	○
R15. We sufficiently invest in our e-commerce projects	○	○	○	○	○
R16. We have sufficient business resources to implement e-commerce	○	○	○	○	○
R17. Our organization is well computerized with LAN and WAN	○	○	○	○	○

[1] The item identification numbers were not included in the questionnaire sent out to respondents.

R19. Our existing systems are flexible and allow us to make changes for e-commerce applications	○	○	○	○	○
R20. We have high bandwidth connectivity to the internet	○	○	○	○	○
R21. We have an established enterprise-wide IT infrastructure	○	○	○	○	○
R22. Our e-commerce solutions are flexible	○	○	○	○	○
R23. Our solutions are customizable to our customers' needs	○	○	○	○	○
R24. We have adequate technological capability for e-commerce implementations	○	○	○	○	○

11. Please indicate the degree of your agreement or disagreement with each of the following statements by placing a tick mark on the appropriate column circle (1, 2, 3, 4 or 5).

	Strongly Agree				**Strongly Disagree**
	1	**2**	**3**	**4**	**5**
C1. Our business has a clear vision on e-commerce	○	○	○	○	○
C2. Our vision of e-commerce activities is widely communicated and understood throughout our company	○	○	○	○	○
C3. Our e-commerce implementations are strategy-led	○	○	○	○	○
C4. All our e-commerce initiatives have champions	○	○	○	○	○
C5. Senior management champions our e-commerce initiatives and implementations	○	○	○	○	○
C7. We have an eCommerce mind-set throughout all levels of management	○	○	○	○	○
C8. Our employees at all levels support our e-commerce initiatives	○	○	○	○	○
C9. Our business demonstrates adequate level of commitment in e-commerce implementations	○	○	○	○	○

12. The following statements are intended to assess how **your organization** perceives the readiness of the local business environment for conducting e-commerce. Please indicate to what extent the opinion in your organization agrees or disagrees with each of the statements.

	Strongly Agree				**Strongly Disagree**
	1	**2**	**3**	**4**	**5**
MFeR1 We believe that our customers are ready to do business on the Internet	○	○	○	○	○
MFeR2 We believe that our business partners are ready to conduct business on the Internet	○	○	○	○	○
GVeR2. We believe that there are effective laws to protect consumer privacy	○	○	○	○	○
GVeR3. We believe that there are effective laws to combat cyber crime	○	○	○	○	○
GVeR4. In general, we believe that the legal environment is conducive to conduct business on the internet	○	○	○	○	○
GVeR5. The government demonstrates strong commitment to promote e-commerce	○	○	○	○	○
GVeR6. Government regulations allow electronic settlement of e-commerce transactions	○	○	○	○	○
SIeR1. Secure electronic transaction (SET) and /or secure electronic commerce environment (SCCE) services are easily available and affordable	○	○	○	○	○
SIeR2. The telecommunication infrastructure is reliable and efficient to support eCommerce and eBusiness	○	○	○	○	○
SIeR3. The technology infrastructure of commercial and financial institutions is capable of supporting eCommerce transactions	○	○	○	○	○
SIeR4. We feel that there is efficient and affordable support from the local IT industry to support our move on the Internet	○	○	○	○	○
Eglobal In general we consider the local environment is ready for e-commerce	○	○	○	○	○

PART III

This part is to be answered **ONLY** by those organizations, which are conducting e-commerce. If your organization **does not conduct e-commerce, that is, if your organization does not have at least an interactive web presence,** please do not respond to this part.

14. Please indicate to what extent the opinion in your organization agrees or disagrees with each of the statements.

	Strongly Agree				Strongly Disagree
	1	2	3	4	5
G1. Roles, responsibilities and accountability are clearly defined within each e-commerce initiative team	○	○	○	○	○
G2. E-commerce accountability is extracted via on-going responsibility	○	○	○	○	○
G3. Decision-making authority has been clearly assigned for all e-commerce initiatives	○	○	○	○	○
G4. Our e-commerce managers are granted the authority to make decisions and take actions as opportunities arise	○	○	○	○	○
G5. Our managers demonstrate readiness for change	○	○	○	○	○
G6. We thoroughly analyze the possible changes to be caused in our organization, suppliers, partners, and customers as a result of each e-commerce implementation	○	○	○	○	○
G7. We follow a systematic process for managing change issues as a result of e-commerce implementations	○	○	○	○	○
G8. We define a business case for each e-commerce implementation or initiative	○	○	○	○	○
G9. There is smooth relationship between the business and internal IT organization	○	○	○	○	○
G10. We have clearly defined metrics for assessing the impact of our e-commerce initiatives	○	○	○	○	○
G11. We believe that we have an effective governance model in our e-commerce implementations	○	○	○	○	○

15. The following statements indicate possible benefits and metrics of e-commerce. Please indicate the extent to which **your organization has experienced these benefits** by expressing your degree of agreement or disagreement.

	Strongly Agree				Strongly Disagree
	1	2	3	4	5
SDV1. Most of our e-commerce projects are completed within schedule	○	○	○	○	○
SDV2. Most of our e-commerce projects are completed within budget	○	○	○	○	○
SDP1. Most of our business transactions are either originated from or concluded at our web site	○	○	○	○	○
SDP2. We are confident that our customers are satisfied with our web site	○	○	○	○	○

We have experienced the following benefits from e-commerce

SBN1. Reduced operation costs (personnel, rent, order and payment processing)	○	○	○	○	○
SBN2. Reduced marketing costs (communications, interactions and managing customer information and bypassing intermediaries)	○	○	○	○	○
SBN4. Reduced costs through Web based purchasing and procurement	○	○	○	○	○
SBN5. Extending firms' reach (market)	○	○	○	○	○
SBN6. Product/service differentiation	○	○	○	○	○
SBN7. Increased customer loyalty and retention	○	○	○	○	○
SBN8. Improved process speed	○	○	○	○	○

SBN9. Improved customer relationship	○	○	○	○	○
SBN10. Improved supplier relationship	○	○	○	○	○
SBN11. Improved company image	○	○	○	○	○
SBN12. Improved internal communication	○	○	○	○	○
SBN13. Improved inter-organizational communication	○	○	○	○	○
SBN14. Increased revenue	○	○	○	○	○
SBN15. Improved competitive position	○	○	○	○	○
SGLOBAL1. We are satisfied with the performance of our e-commerce applications	○	○	○	○	○

16. If you have any suggestions, please state them in the following space

17. If you want to receive a summary of the results of the study, please provide your contact address (including e-mail) below

THANK YOU FOR YOUR TIME

APPENDIX 5B Item Descriptions as Appeared on the Instrument Used for the Pilot Study

The instrument also included the whole of part one in Appendix 5A. In addition, the questionnaire had an identical format to the one in Appendix 5A

Item ID	Description
A1	Our business considers that e-commerce is a North American trend not yet applicable to our environment
A2	E-commerce applications are becoming common with our partner organizations
A3	Businesses with whom our organization is competing are implementing e-commerce and e-business
A4	Our business recognizes the opportunities and threats enabled by e-commerce
A5	Our organization has a good understanding of e-commerce business models that are applicable to our business
A6	We have a good understanding of e-commerce application solutions that are applicable to our business
A7	We have a clear understanding of the potential benefits of e-commerce to our business
A8	Our organization believes that the gain from e-commerce outweighs its cost
A9	We consider that e-commerce has a tremendous impact on the way business is to be conducted in our industry
A10	We believe that businesses in our industry that are **not** adopting e-commerce and e-business will be at a competitive disadvantage
A11	In general our business has adequate awareness about e-commerce
R1	Most of our employees are computer literate
R2	Most of our employees have **unrestricted access to computers**
R3	Most of our employees have **unrestricted Internet access**
R4	We have created clearly defined, e-commerce career paths within our organization
R5	Our business has the necessary technical, managerial and other skills to implement e-commerce
R6	Our people are open and trusting with one another
R7	Communication is very open in our organization
R8	Our organization exhibits a culture of enterprise wide information sharing
R9	We have a policy that encourages grass roots e-commerce initiatives
R10	We are aggressive in experimenting with new technologies
R11	Failure can be tolerated in our organization
R12	Our organization is capable of dealing with rapid changes
R13	We have strong relationships with our suppliers and customers
R14	We have sufficient experience with network based applications
R15	We sufficiently invest in our e-commerce projects
R16	We have sufficient business resources to implement e-commerce
R17	Our organization is well computerized with LAN and WAN
R18	Our eCommerce solutions are interactive and allow two way communication
R19	Our existing systems are flexible and allow us to make changes for e-commerce applications
R20	We have high bandwidth connectivity to the internet
R21	We have an established enterprise-wide IT infrastructure
R22	Our e-commerce solutions are flexible
R23	Our solutions are customizable to our customers' needs
R24	We have adequate technological capability for e-commerce implementations
C1	Our business has a clear vision on e-commerce
C2	Our vision of e-commerce activities is widely communicated and understood throughout our company
C3	Our e-commerce implementations are strategy-led
C4	All our e-commerce initiatives have champions
C5	Senior management champions our e-commerce initiatives and implementations
C6	We have staffed our e-commerce projects with the proper resources to achieve their goals
C7	We have an e-commerce mind-set throughout all levels of management
C8	Our employees at all levels support our e-commerce initiatives
C9	Our business demonstrates adequate level of commitment in e-commerce implementations
G1	Roles, responsibilities and accountability are clearly defined within each e-commerce initiative team
G2	E-commerce accountability is extracted via on-going responsibility
G3	Decision-making authority has been clearly assigned for all e-commerce initiatives
G4	Our e-commerce managers are granted the authority to make decisions and take actions as opportunities arise
G5	Our managers demonstrate readiness for change

G6	We thoroughly analyze the possible changes to be caused in our organization, suppliers, partners, and customers as a result of each e-commerce implementation
G7	We follow a systematic process for managing change issues as a result of e-commerce implementations
G8	We define a business case for each e-commerce implementation or initiative
G9	There is smooth relationship between the business and internal IT organization
G10	We have clearly defined metrics for assessing the impact of our e-commerce initiatives (H)
G11	We believe that we have an effective governance model in our e-commerce implementations

Item ID	Description
MFeR1	We believe that our customers are ready to do business on the Internet
MFeR2	We believe that our business partners are ready to conduct business on the Internet
GVeR1	Our business considers Internet as a safe environment for conducting business
GVeR2	We believe that there are effective laws to protect consumer privacy
GVeR3	We believe that there are effective laws to combat cyber crime
GVeR4	In general, we believe that the legal environment is conducive to conduct business on the internet
GVeR5	The government demonstrates strong commitment to promote e-commerce
GVeR6	Government regulations allow electronic settlement of e-commerce transactions
SIeR1	Secure electronic transaction (SET) and /or secure electronic commerce environment (SCCE) services are easily available and affordable
SIeR2	The telecommunication infrastructure is reliable and efficient
SIeR3	The technology infrastructure of commercial and financial institutions is capable of supporting e-commerce transactions
SIeR4	We feel that there is efficient and affordable support from the local IT industry to support our move on the Internet
Eglobal	In general we consider the local environment is ready for e-commerce

Item Id	Description
SDV1	Most of our e-commerce projects are completed within schedule
SDV2	Most of our e-commerce projects are completed within budget
SDP1	Most of our business transactions are either originated from or concluded at our web site
SDP2	We are confident that our customers are satisfied with our web site
SBN1	Reduced operation costs (personnel, rent, order and payment processing)
SBN2	Reduced marketing costs (communications, interactions and managing customer information and bypassing intermediaries)
SBN3	Extending firms' reach (market)
SBN4	Product/service differentiation
SBN5	Locking Customers (trading partners)
SBN6	Improved process speed
SBN7	Improved customer relationship
SBN8	Improved company image
SBN9	Improved internal communication
SBN10	Improved inter-organizational communication
SBN11	Reduced costs of maintaining up-to-date company information
SBN12	Reduced costs through Web based purchasing and procurement
SBN13	Improved supplier relation
SBN14	Increased Revenue
SBN15	Improved competitive position
Sglobal	We are satisfied with the performance of our e-commerce applications

APPENDIX 5C Instrument Used in Pre-testing

In all cases, the scale used was a five point Likert type scale ranging from not at all relevant (1) to extremely relevant (5).

Awareness

Please rate the degree of relevance of each of the following statements as measures of e-commerce awareness

A1	Our business keeps track of developments in e-commerce technologies
A2	Our business conducts continuous assessment of e-commerce business models
A3	Our business is well informed of various e-commerce application solutions
A4	We continuously assess our business processes for possible ways of moving them to the Internet
A5	We understand the potential benefits of moving our business to the Internet
A6	In general, our business is familiar with the opportunities/ threats enabled by e-commerce
A7	Our business routinely follows-up competitors' e-commerce initiatives
A8	Our business routinely monitors our partners e-commerce initiatives
A9	Our business closely follows e-commerce success stories of businesses in our line
A10	Our business closely monitors the impacts of e-commerce in our industry
A11	We encourage our employees to participate in e-commerce trainings and seminars
A12	E-commerce ideas are widely communicated in our organization
A13	We have e-commerce awareness programs in place in our business
A14	In general, our business has adequate awareness to implement e-commerce
Please provide additional indicators that you believe are worthy of evaluation	

Commitment

The following statements are designed to test the commitment of an organization to e-commerce. Please rate the relevance of each statement as a possible measure of commitment

C1	Most of our e-commerce projects are begun after considering how they should or would be linked to the business plans and company strategies
C2	Our business has a clear vision on e-commerce
C3	Our vision of e-commerce activities is widely communicated and understood throughout our company
C4	E-commerce decisions in our business are considered as strategic business decisions
C5	Our e-commerce implementations are strategy-led
C6	All our e-commerce initiatives have champions
C7	Senior management champions our e-commerce initiatives and implementations
C8	We have staffed our e-commerce projects with the proper resources to achieve their goals
C9	We have an e-commerce mind-set throughout all levels of management
C10	Our employees at all levels support our e-commerce initiatives
C11	In general, our business demonstrate adequate level of commitment to implement e-commerce
Please provide additional indicators that you believe are worthy of evaluation	

Governance

The following statements are designed to assess the way an organization is organizing itself in implementing e-commerce, that is, its e-commerce governance model. Please rate the relevance of each statement as a possible measure of governance

G1	Roles, responsibilities and accountability are clearly defined within each e-commerce initiative team
G2	E-commerce accountability is extracted via on-going responsibility
G3	Decision-making authority has been clearly assigned for all e-commerce initiatives
G4	Our e-commerce managers are granted the authority to make decisions as opportunities arise
G5	In general our managers demonstrate readiness for change
G6	We follow a systematic process for managing change issues as a result of eCommerce implementations
G7	We thoroughly analyze the possible changes to be caused in our organization, suppliers, partners, and customers as a result of each e-commerce implementation
G8	We define a business case for each e-commerce implementations (initiatives)
G9	There is smooth relationship between the business and IT organization
G10	We have clearly defined metrics for assessing the impact of our e-commerce initiatives
G11	In general, we follow an effective governance model in our e-commerce implementations
Please provide additional items that you believe are worthy of evaluation	

Human Resources

Please rate the relevance of each of the following statements as possible measurements of the human resources of an organization as related to e-commerce

R1	We are providing the proper incentives to retain our e-commerce expertise
R2	Our e-commerce efforts help recruit and retain the best talent in our organization
R3	We have created clearly defined, e-commerce career paths within our organization
R4	Most of our employees are computer literate
R5	Most of our employees have access to computers
R6	Most of our employees have unrestricted Internet access
R7	Our business has the necessary technical, managerial and other skills to implement e-commerce
Please provide any human resources related factors that you believe are worthy of evaluation	

Business Resources

The following statements are intended to measure the business resources, such as culture, business relationship, electronic capabilities and e-commerce-business integration of an organization. Please rate the relevance

R8	Our people are open and trusting with one another
R9	We have very little formal bureaucracy in our company
R10	Communication is very open in our organization
R11	Our organization exhibits a culture of enterprise wide information sharing
R12	We have a policy that encourages grass roots e-commerce initiatives
R13	We are aggressive in experimenting with new technologies
R14	Failure can be relished (tolerated) in our organization
R15	Our organization is capable of dealing with rapid and ongoing change
R16	We have strong relationships with our extended enterprise (suppliers, customers)
R17	We have sufficient experience with network based applications
R18	The majority of internal communication is done electronically
R19	The majority of our communication with our extended enterprise is conducted electronically
R20	The majority of our transactions with our extended enterprise is conducted electronically
R21	Our existing e-commerce activities are well-integrated with our business strategy
R22	Our e-commerce applications are integrated with other back office and front office applications
R23	We sufficiently invest in our e-commerce projects
R24	We have sufficient business resources to implement e-commerce
Please provide additional business resources variables that you believe are worthy of evaluation	

Technology resources

Please rate the relevance of each of the following statements as possible measures of the technological resources of an organization as related to e-commerce.

R25	Our organization is well computerized with LAN and WAN
R26	Most of our applications are network based
R27	Our existing systems are flexible and allow us to make changes for e-commerce applications
R28	We have a high quality (high band width) connectivity to the internet
R29	Our e-commerce solutions are interactive and allow two way communication
R30	Our e-commerce solutions are flexible enough to accommodate change
R31	We have an established IT infrastructure across enterprise
R32	Our solutions are customizable to our customer's needs
R33	We have the necessary technological resources to engage in eCommerce
Please provide any technology resources measure that you believe are worthy of evaluation	

Perception about the Readiness of the National environment

The following statements are intended to assess the perception of business organizations about the readiness of the environment within which they are operating. Please rate the relevance of each item

MFeR1	We believe that a significant proportion of our potential customers have access to the Internet
MFeR2	We believe that our potential customers are ready to do business on the Internet
MFeR3	We believe that our trading partners are ready to conduct business on the Internet
GVeR1	Our business considers internet as a safe environment for conducting business
GVeR2	We believe that there are effective laws to protect consumer privacy
GVeR3	We believe that there are effective laws to combat cyber crime
GVeR4	In general, we believe that the legal environment is conducive to conduct business on the internet
GVeR5	The government demonstrates strong commitment to level the playing field for e-commerce
GVeR6	Government regulations allow electronic settlement of e-commerce transactions
SIeR1	Secure electronic transaction (SET) and /or secure electronic commerce environment (SCCE) services

	are easily available and affordable
SIeR2	The telecommunication infrastructure is reliable and efficient
SIeR3	The technology infrastructure of commercial and financial institutions is capable of supporting e-commerce transactions
SIeR4	We feel that there is efficient and affordable support from the local IT industry to support our move on the Internet
In general we consider the local environment is ready to conduct business on the Internet	

E-commerce Success

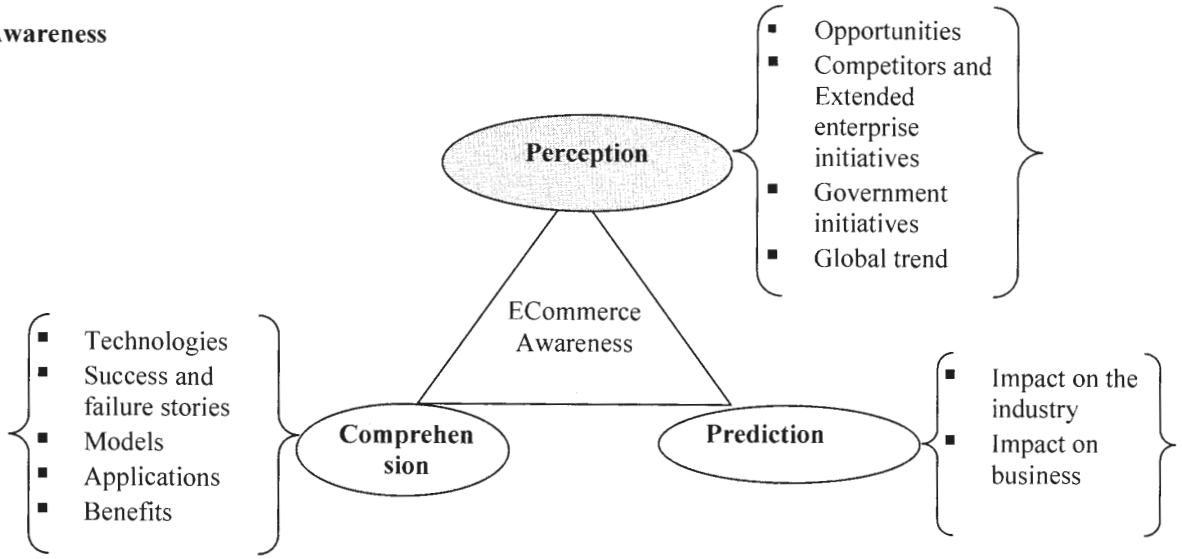
Please rate the relevance of the following indicators as possible measures of e-commerce success

SDV1	Most of our e-commerce projects are completed within schedule
SDV2	Most of our e-commerce projects are completed within budget
SDP1	Most of our business transactions are either originated from or concluded at our site
SDP2	We are confident that our customers are satisfied with our site
SDP3	Within our industry we have more e-commerce initiatives than other companies
SDP4	Within our industry our e-commerce implementation is much more advanced
	Benefits resulting from e-commerce
SBN1	Reduced operation costs (personnel, rent, order and payment processing)
SBN2	Reduced marketing costs (communications, interactions and managing customer information and bypassing intermediaries)
SBN3	Extending firms' reach (market)
SBN4	Product/service differentiation
SBN5	Lock customers (trading partners)
SBN6	Improved process speed
SBN7	Improved customer relationship
SBN8	Improved company image
SBN9	Improved internal communication
SBN10	Improved inter-organizational communication

- Three of the experts were involved in the Pan African eCommerce initiative and eCommerce baseline study.
- Another 3 of the experts were extensively involved in various capacities in the preparation of the South African eCommerce discussion, green and white papers.
- Two experts belong to a local NGO working towards bridging the digital divide and have produced a comprehensive comparison of existing eReadiness assessment tools.
- Two experts came from an eCommerce Consulting firm in South Africa.
- The rest of the experts were academicians, with relevant research experience in eCommerce and include four professors, three associate professors, one assistant professor and two lecturers.

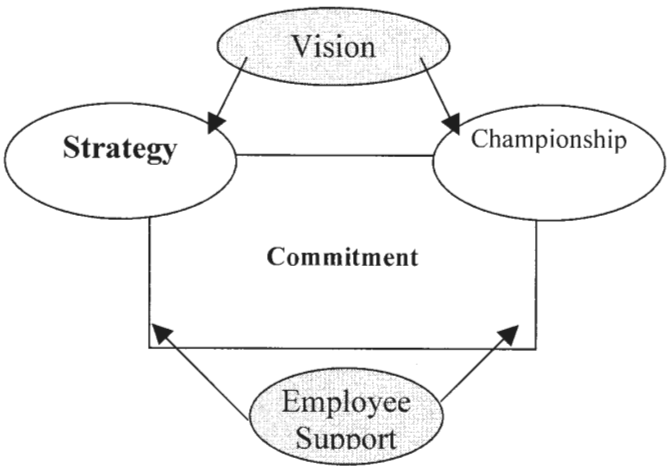
APPENDIX 5D Initial Pool Of Items

Awareness



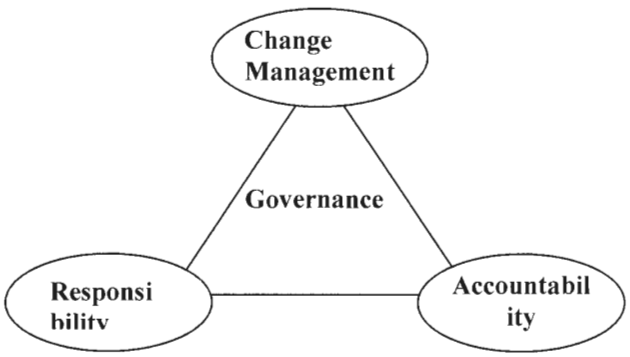
Item ID	Description
A1	In my organization our key managers are aware of e-commerce technologies (internet, web, client/server,)
A2	In my organization our employees are aware of e-commerce technologies
A3	In my organization, our key managers are aware of e-commerce models that are relevant to our business
A4	In my organization, our employees are aware of e-commerce business models that are relevant to our business
A5	In my organization, we are aware of the benefits we are going to get by engaging in e-commerce
A6	In my organization, we are aware of the potentials of implementing e-commerce to our business (
A7	In my organization, we are aware of the opportunities of e-commerce to our business
A8	In my organization we are aware of the threats enabled by e-commerce
A9	Our business routinely evaluates and is aware of competitor's e-commerce initiatives (Hartman)
A10	Our business routinely evaluates and is aware of e-commerce activities in the industry
A11	Our business is aware of the e-commerce initiatives of our partners (such as suppliers)
A12	Our business is aware of our customer's expectations in terms e-commerce related service delivery
A13	Our business is aware of government initiatives/actions/policies and activities related to e-commerce
A14	Our business is aware of e-commerce success stories of firms that are similar to our business
A15	We are aware of e-commerce success stories of organizations that are in a different line of business from our organization
A16	We are aware of e-commerce failure stories of firms that are similar to our business
A17	We are aware of e-commerce failure stories of organizations that are in a different line of business from our organization
A18	The key managers of our organization do attend e-commerce-related training conferences, seminars and workshops
A19	We encourage our employees to attend and participate in e-commerce-related training conferences, seminars and workshops
A20	We have conducted e-commerce studies in our company
A21	We have e-commerce awareness programs in place in our business
A22	We are aware of the impacts of e-commerce in our industry
A23	We are aware of the impacts of e-commerce in our value chain (supplier, consumer)
A24	We are aware of the security issues related to providing access to information over the internet (Hartman)
A25	Our employees are aware of our businesses e-commerce initiatives
A26	We have easy access to e-commerce related information

Commitment



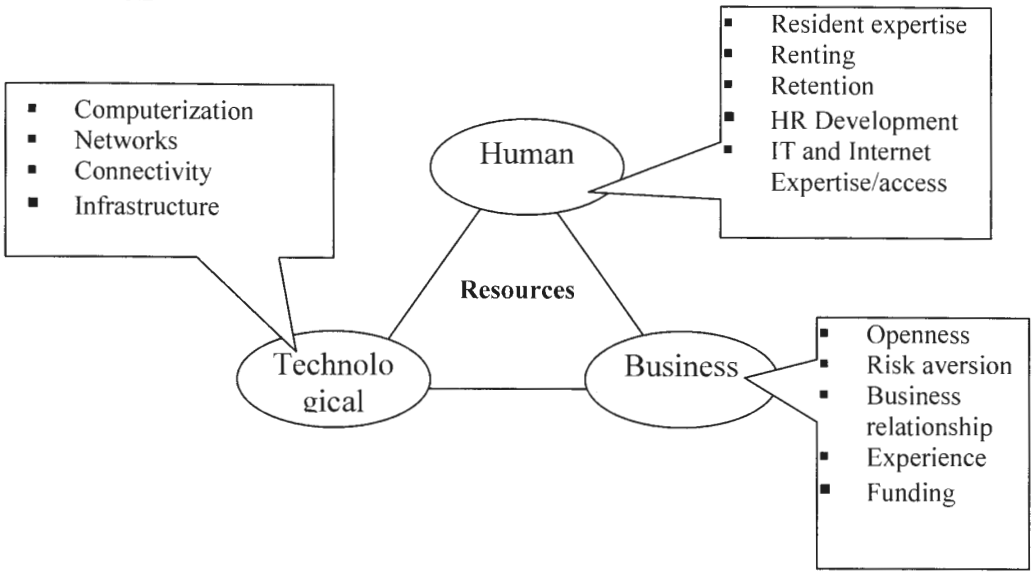
Item ID	Description
C1	Our e-commerce implementation is strategy-led
C2	Our strategic plans include an E-commerce strategy (Hartman)
C3	E-commerce in our business is a tactical disposition
C4	E-commerce in our business is a matter of strategic consideration
C5	Our Top executives have clearly communicated their commitment to e-commerce (P)
C6	Generating competitive advantage via e-commerce technologies is a top priority for senior management (H)
C7	We sufficiently invest in our web site maintenance (H)
C8	We have staffed our e-commerce projects with the proper resources to achieve their goals (H)
C9	Senior management champions our e-commerce initiatives and implementations
C10	Our vision of e-commerce activities is widely communicated and understood throughout our company (H
C11	Our employees support and buy our e-commerce initiatives
C12	Our managers at all levels support and buy our e-commerce initiatives
C13	Senior management is heavily involved in the development of e-commerce direction (H)
C14	We have an e-commerce mind-set throughout all levels of management (H)

Governance



G1	Roles, responsibilities and accountability are clearly defined within each e-commerce initiative team (H)
G2	E-commerce accountability is extracted via on-going responsibility (NNI)
G3	Decision making authority has been clearly assigned for all e-commerce initiatives
G4	Our e-commerce managers are granted the authority to make decisions and take actions as opportunities arise
G5	In general our managers demonstrate readiness for change
G6	We follow a systematic process for managing change issues as a result of e-commerce implementations
G7	Most of our e-commerce projects are begun without considering how they should or would be linked to the business plans and company strategies (Z)
G8	We have an established process for assessing and selecting alternative e-commerce strategies (H)
G9	There is smooth relationship between the business and IT organization
G10	E-commerce sponsorship is extracted via senior accountability (NNI)
G11	E-commerce activities are managed by a cross-functional team that includes business and IT managers (H)
G12	Top management is empowered to manage Internet initiative (H)

RESOURCE



Item id	Description
Human Resources	
R1	We are providing the proper incentives to retain our expertise
R2	Our e-business efforts help recruit and retain the best talent in our organization
R3	We have created clearly defined, e-commerce career paths within our organization (H)
R4	The majority of our employees are computer literate
R5	Only few staff are computer literate
R6	All our employees have access to computers (MBWS)
R7	Only key staff have access to computers (MBWS)
R8	All Our employees have unrestricted Internet access
R9	Internet access is limited only to a few staff
R10	We can rent easily the required technical, managerial and other skills to implement e-commerce
R11	We have staff e-commerce development and training programs in place
R12	Our business has the necessary technical, managerial and other skills to implement e-commerce
Business Resources	
R13	Our people are open and trusting with one another (Powell)
R14	We have very little formal bureaucracy in our company (P)
R15	Our people would say this is a loose informal place to work (P)
R16	Communication is very open in our organization (P)
R17	Our people communicate widely, not just with their own departments (P)
R18	Communication is very open between the different departments in our organization
R19	Our employees, customers and partners have ubiquitous access to business-critical information and processes (H)
R20	Our organization exhibits a culture of enterprise wide information sharing (H)
R21	We have a policy that encourages grass roots e-commerce initiatives
R22	We are aggressive in experimenting with new technologies
R23	Our organization is cautious in technology implementation
R24	Failure can be relished (tolerated)in our organization
R25	Our organization is capable of dealing with rapid and ongoing change (H)
R26	We have strong relationships with our extended enterprise (suppliers, customers,..) (H)
R27	We have experience managing multiple relationships
R28	We have sufficient experience with network based applications
R29	The majority of internal communication is done electronically
R30	The majority of our communication with our extended enterprise is conducted electronically
R31	The majority of our transactions with our extended enterprise is conducted electronically
R32	Our existing e-commerce activities are well-integrated with our business strategy (H)
R33	We have proper funding to execute e-commerce initiatives
R34	We sufficiently invest in our e-commerce projects
R35	Our organization has the ability/practice of learning from our e-commerce projects

Technological resources	
R36	Our organization is well computerized with LAN and WAN
R37	Most of our applications are network based
R38	Our existing systems are flexible and allow us to make changes for e-commerce applications
R39	We have a high quality (high band width) connectivity to the internet
R40	Our e-commerce solutions are interactive and allow two way communication
R41	Our e-commerce solutions are flexible enough to accommodate change (H)
R42	We have an established IT infrastructure across enterprise (H)
R43	Our solutions are customizable to our customer's needs (H)
R44	The IT organization is well respected by business management (H)
R45	IT is viewed as an e-business partner providing consulting services to the business unit (H)
R46	The vast majority of our new application development is e-commerce oriented (H)
R47	Our e-commerce systems are well integrated with other back-office and front office applications (activities)
R48	We have the necessary technological infrastructure and competencies to engage in e-commerce initiatives (H)

Environmental eReadiness

1. Market forces eReadiness
2. Government E-readiness
3. Supporting Industries E-readiness

Item ID	Description
MfeR1	A critical mass (a significant portion) of the society have access to the internet
MfeR2	Internet points-of–presence are available in major towns outside the capital (D)
MFeR3	Mechanisms are in place to service (connect) rural communities to the Internet
MFeR4	A significant proportion of the business use the Internet
MFeR5	E-commerce is being implemented by business organizations outside the capital
MfeR6	Most local businesses maintain web sites
MfeR7	Most business have registered domain names
MfeR8	Most businesses conduct business to business transactions electronically
MfeR9	Most local business have incorporated their web sites into their procurement, inventory management and sales processes
GveRI	There is an effective law that protects Consumer privacy
GveR2	There is an effective legal framework to combat cyber crime
GveR3	There is an effective legal framework that authorizes electronic commerce
GveR4	Most governmental agencies use web sites to interact with their constituencies
GveR5	The market for basic telecommunications infrastructure is characterized by open and effective competition
GveR6	The Internet market is competitive and there are no barriers to market entry
GveR7	There is a true "independent" regulator separated from the operator with a power to discharge its responsibilities
GveR8	There are significant efforts to automate government processes
GveR9	There is evidence that the government is promoting the development of e-society on a national level
GveR10	There is evidence that the government has given priority to promote the development of e-commerce
GveR11	There is a national e-commerce framework to guide the governments initiatives
GveR12	Government regulations allow electronic settlement of e-commerce transactions
SieR1	Secure electronic transaction (SET) and /or secure electronic commerce environment (SCCE) services are easily available and affordable
SIeR2	The telecommunication infrastructure is reliable and efficient
SieR3	Financial institutions are allowed to issue credit card to consumers
SieR4	Foreign exchange rules don't discourage purchases from international web sites
SieR5	The technology infrastructure of commercial financial institutions is capable of supporting e-commerce transactions
SieR6	There are well-developed wireless and satellite services as alternative to the wireline network
SieR7	There are a number of Internet service providers offering access, content and other specialized services
SieR8	Dedicated and/or high speed Internet connection is widely available to large business users
SieR9	A wide range and sophisticated IT support services are available at affordable price

E-commerce Success

Adoption, Development, Deployment, Benefit to Organization

Item Id	Description
SDV1	Most of our e-commerce projects are completed within schedule
SDV2	Most of our e-commerce projects are completed within budget
SDV3	Our e-commerce project implementation is mostly successful
SDP1	Visit frequency
SDP2	Repeat visitors
SDP3	Site performance
SDP4	Within our industry we have more e-commerce initiatives than other companies
SDP5	Within our industry our e-commerce implementation is much more advanced
SBN1	Reduced operation costs (personnel, rent, order and payment processing)
SBN2	Reduced marketing costs (communications, interactions and managing customer information and bypassing intermediaries)
SBN3	Reaching new markets
SBN4	Extending firms' reach (market)
SBN5	Product/service differentiation
SBN6	Lock customers (trading partners)
SBN7	Improved process speed
SBN8	Improved customer relationship
SBN9	Improved customer service
SBN10	Improved customer communication
SBN11	Improved company image
SBN12	Improved internal communication
SBN13	Improved inter-organizational communication
SBN14	Improved productivity
SBN15	Improved profitability
SBN16	Enhance competitive position
SBN17	Optimized supply chain

Appendix 5E Instrument Development Worksheet : Tracking Item identification numbers at various stages of the instrument development process

	Initial Pool of Items-Item Id as in Appendix 5D	After discussion with supervisor - Item ID as in Appendix 5C	After Panel of experts-item ID as in Appendix 5B	After Pilot Testing-Item ID as in Appendix 5A
	A1	A1		
	A2			
	A3	A2	A5	A5
	A4			
	A5	A5	A7	A7
	A6			
	A7	A6	A4	A4
	A8			
	A9	A7	A3	A3
	A10			
	A11	A8	A2	A2
	A12			
	A13			
	A14	A9		
	A15			
	A16			
	A17			
	A18	A11		
	A19			
	A20			
	A21	A13		
	A22	A10	A9	A9
	A23			
	A24			
	A25	A12		
	A26			
		A3	A6	
		A4		
		A14	A11	A11
			A1	A1
			A8	A8
			A10	A10
Total no of items	26	26	14	11
Combined/dropped		15	6	1
Added		3	3	
No of items to next stage		14	11	10

Initial Pool of Items-Item Id as in Appendix 5D	After discussion with supervisor - Item ID as in Appendix 5C	After Panel of experts-item ID as in Appendix 5B	After Pilot Testing-Item ID as in Appendix 5A
C 1	C 5	C3	C3
C 2			
C 3			
C 4	C4		
C 5			
C 6			
C 7			
C 8	C8	C6	
C 9	C7	C5	C5
C 10	C 3	C 2	C2
C 11	C 10	C8	C8
C 12			
C 13			
C 14	C 9	C7	C7
	C 1		
	C 2	C 1	C1
	C 6	C4	C4
	C 11	C9	C9
14	14	11	9
	6	2	1
	4		
	11	9	8

Initial Pool of Items-Item Id as in Appendix 5D	After discussion with supervisor Item ID as in Appendix 5C	After Panel of experts-item ID as in Appendix 5B	After Pilot Testing-Item ID as in Appendix 5A
G1	G1	G1	G1
G2	G2	G2	G2
G3	G3	G3	G3
G4	G4	G4	G4
G5	G5	G5	G5
G6	G6	G6	G6
G7			
G8			
G9	G9	G9	G9
G10			
G11			
G12			
	G7	G7	G7
	G8	G8	G8
	G10	G10	G10
	G11	G11	G11
12	12	11	11
	5		
	4		
	11	11	11

APPENDIX 5E Instrument Development Worksheet

Appendix 5E Instrument Development Worksheet : Tracking Item identification numbers at various stages of the instrument development process

	Initial Pool of Items-Item Id as in Appendix 5D	After discussion with supervisor Item ID as in Appendix 5C	After Panel of experts-item ID as in Appendix 5B	After Pilot Testing-Item ID as in Appendix 5A
	R1	R1		
	R2	R2		
	R3	R3	R4	R4
	R4	R4	R1	R1
	R5			
	R6	R5	R2	R2
	R7			
	R8	R6	R3	R3
	R9			
	R10			
	R11			
	R12	R7	R5	R5
	R13	R8	R6	R6
	R14	R9		
	R15			
	R16			
	R17	R10	R7	R7
	R18			
	R19	R11	R8	R8
	R20			
	R21	R12	R9	R9
	R22	R13	R10	R10
	R23			
	R24	R14	R11	R11
	R25	R15	R12	R12
	R26	R16	R13	R13
	R27			
	R28	R17	R14	R14
	R29	R18		
	R30	R19		
	R31	R20		
	R32	R21		
	R33			
	R34	R23	R15	R15
	R35			
	R36	R25	R17	R17
	R37	R26	R18	
	R38	R27	R19	R19
	R39	R28	R20	R20
	R40	R29		
	R41	R30	R21	R21
	R42	R31	R22	R22
	R43	R32	R23	R23
	R44			
	R45			
	R46			
	R47			
	R48	R33	R24	R24
		R22		
		R24	R16	R16
Total no of items	48	48	33	24
Combined/dropped		21	9	1
Added		2		
No of items to next stage		33	24	23

Initial Pool of Items-Item Id as in Appendix 5D	After discussion with supervisor - Item ID as in Appendix 5C	After Panel of experts-item ID as in Appendix 5B	After Pilot Testing-Item ID as in Appendix 5A
MFeR1	MFeR1		
MFeR2			
MFeR3			
MFeR4	MFeR3	MFeR2	MFeR2
MFeR5			
MFeR6			
MFeR7			
MFeR8			
MFeR9			
GVeR1	GVeR2	GVeR2	GVeR2
GVeR2	GVeR3	GVeR3	GVeR3
GVeR3	GVeR4	GVeR4	GVeR4
GVeR4	GVeR5	GVeR5	GVeR5
GVeR5			
GVeR6			
GVeR7			
GVeR8			
GVeR9			
GVeR10			
GVeR11			
GVeR12	GVer6	GVeR6	GVeR6
SIeR1	SIeR1	SIeR1	SIeR1
SIeR2	SIeR2	SIeR2	SIeR2
SIeR3	SIeR3	SIeR3	SIeR3
SIeR4			
SIeR5			
SIeR6	SIeR4	SIeR4	SIeR4
SIeR7			
SIeR8			
SIeR9			
	MFeR2	MFeR1	MFeR1
	GVeR1		
	GVeR2	GVeR1	
	EGlobal	EGlobal	EGlobal
30	30	15	13
	24	2	1
	4		
	15	13	12

Initial Pool of Items-Item Id as in Appendix 5D	After discussion with supervisor Item ID as in Appendix 5C	After Panel of experts-item ID as in Appendix 5B	After Pilot Testing-Item ID as in Appendix 5A
SAD1	SAD1	SAD1	
SAD2	SAD2	SAD2	SAD1
SDV1	SDV1	SDV1	SDV1
SDV2	SDV2	SDV2	SDV2
SDV5			
SDP1	SDP2	SDP2	SDP2
SDP2			
SDP3			
SBN1	SBN1	SBN1	SBN1
SBN2	SBN2	SBN2	SBN2
SBN3	SBN3	SBN3	SBN5
SBN4			
SBN5	SBN4	SBN4	SBN6
SBN6	SBN5	SBN5	SBN7
SBN7	SBN6	SBN6	SBN8
SBN8	SBN7	SBN7	SBN9
SBN9			
SBN10			
SBN11	SBN8	SBN8	SBN11
SBN12	SBN9	SBN9	SBN12
SBN13	SBN10	SBN10	SBN13
SBN14			
SBN15			
SBN16			
SBN17			
	SDP1	SDP1	SDP1
		SBN11	SBN3
		SBN12	SBN4
		SBN13	SBN10
		SBN14	SBN14
		SBN15	SBN15
		SGLOBAL	SGLOBAL
25	25	17	23
	13		1
	1	6	
	17	23	22

APPENDIX 5F: Correlations for Inter-observer Reliability

Appendix 5F
Correlations for Inter-observer Reliability

Correlations (panel.sta)
Marked correlations are significant at p < .01000
N=100 (Casewise deletion of missing data)

	Rater 1	Rater 2	Rater 3	Rater 4	Rater 5	Rater 6	Rater 7	Rater 8	Rater 9	Rater 10	Rater 11	Rater 12	Rater 13	Rater 14	Rater 15	Rater 16	Average
Rater 1	1																
Rater 2	0.525271	1															
Rater 3	0.384824	0.656769	1														
Rater 4	0.530928	0.663247	0.500327	1													
Rater 5	0.491734	0.656527	0.547928	0.573777	1												
Rater 6	0.462982	0.692961	0.742838	0.594687	0.618015	1											
Rater 7	0.320417	0.64348	0.688563	0.50326	0.5062	0.727525	1										
Rater 8	0.652433	0.656642	0.668013	0.579425	0.598605	0.752739	0.620202	1									
Rater 9	0.557584	0.760675	0.661541	0.733712	0.5988	0.635941	0.609748	0.698353	1								
Rater 10	0.362114	0.777125	0.717358	0.524387	0.545129	0.729787	0.701755	0.648116	0.635121	1							
Rater 11	0.515681	0.578157	0.710703	0.606313	0.617022	0.60956	0.450355	0.646672	0.643342	0.506372	1						
Rater 12	0.575599	0.609541	0.434993	0.617308	0.539622	0.465577	0.457246	0.562752	0.630725	0.528663	0.486975	1					
Rater 13	0.420421	0.470912	0.663323	0.386788	0.790465	0.637778	0.505808	0.606202	0.479568	0.534291	0.635137	0.377228	1				
Rater 14	0.389517	0.671319	0.786126	0.492047	0.588158	0.832402	0.720942	0.689709	0.621383	0.719603	0.672781	0.533082	0.664159	1			
Rater 15	0.499858	0.688334	0.600608	0.700764	0.637967	0.606719	0.717812	0.651789	0.704859	0.56226	0.591081	0.586582	0.462579	0.606269	1		
Rater 16	0.574663	0.685341	0.627138	0.584892	0.658766	0.703895	0.490851	0.771596	0.716138	0.611396	0.705194	0.487331	0.583802	0.659272	0.670528	1	
Average	**0.656699**	**0.84679**	**0.817821**	**0.759091**	**0.790634**	**0.853213**	**0.755565**	**0.852912**	**0.842558**	**0.794209**	**0.789284**	**0.70230**	**0.730432**	**0.837718**	**0.808863**	**0.832644**	1

APPENDIX 5G Instrument Pre-testing Descriptive Statistics

Appendix 5G

Instrument Pre-testing Descriptive Statistics

	Frequency Distribution									
	Not at all relevant				Extremely relevant					
	1	2	3	4	5	Valid N	Mean	Minimum	Maximum	Std.Dev.
A1	**6**	**6**	**3**	**0**	**1**	**16**	**2.00**	**1**	**5**	**1.10**
A2	0	2	4	5	5	16	3.81	2	5	1.05
A3	0	0	6	4	6	16	4.00	3	5	0.89
A4	**10**	**6**	**0**	**0**	**0**	**16**	**1.38**	**1**	**2**	**0.50**
A5	0	2	4	4	6	16	3.88	2	5	1.09
A6	0	0	4	6	6	16	4.13	3	5	0.81
A7	0	4	2	2	8	16	3.88	2	5	1.31
A8	0	4	2	2	8	16	3.88	2	5	1.31
A9	**5**	**6**	**1**	**0**	**4**	**16**	**2.50**	**1**	**5**	**1.59**
A10	0	2	2	4	8	16	4.13	2	5	1.09
A11	**10**	**3**	**3**	**0**	**0**	**16**	**1.56**	**1**	**3**	**0.81**
A12	**5**	**5**	**3**	**2**	**1**	**16**	**2.31**	**1**	**5**	**1.25**
A13	**9**	**6**	**1**	**0**	**0**	**16**	**1.50**	**1**	**3**	**0.63**
A14	0	4	0	2	10	16	4.13	2	5	1.31
C1	**10**	**6**	**0**	**0**	**0**	**16**	**1.38**	**1**	**2**	**0.50**
C2	0	1	7	5	3	16	3.63	2	5	0.89
C3	1	0	3	6	6	16	4.00	1	5	1.10
C4	**6**	**9**	**1**	**0**	**0**	**16**	**1.69**	**1**	**3**	**0.60**
C5	0	0	2	4	10	16	4.50	3	5	0.73
C6	1	0	4	4	7	16	4.00	1	5	1.15
C7	0	0	2	7	7	16	4.31	3	5	0.70
C8	0	3	3	4	6	16	3.81	2	5	1.17
C9	0	5	6	4	1	16	3.06	2	5	0.93
C10	0	1	6	4	5	16	3.81	2	5	0.98
C11	0	0	0	8	8	16	4.50	4	5	0.52
G1	0	2	6	6	2	16	3.50	2	5	0.89
G2	0	3	7	5	1	16	3.25	2	5	0.86
G3	0	0	2	4	10	16	4.50	3	5	0.73
G4	1	1	12	2	0	16	2.94	1	4	0.68
G5	0	0	4	12	0	16	3.75	3	4	0.45
G6	0	2	8	6	0	16	3.25	2	4	0.68
G7	0	0	0	4	12	16	4.75	4	5	0.45
G8	0	0	3	10	3	16	4.00	3	5	0.63
G9	0	0	13	3	0	16	3.19	3	4	0.40
G10	0	6	3	7	0	16	3.06	2	4	0.93
G11	0	0	0	3	13	16	4.81	4	5	0.40
R1	**6**	**5**	**3**	**2**	**0**	**16**	**2.06**	**1**	**4**	**1.06**
R2	**8**	**2**	**6**	**0**	**0**	**16**	**1.88**	**1**	**3**	**0.96**
R3	0	2	1	4	9	16	4.25	2	5	1.06
R4	2	0	4	7	3	16	3.56	1	5	1.21
R5	0	1	4	6	5	16	3.94	2	5	0.93
R6	0	2	0	2	12	16	4.50	2	5	1.03
R7	0	0	3	5	8	16	4.31	3	5	0.79
R8	0	5	8	2	1	16	2.94	2	5	0.85
R9	**5**	**5**	**6**	**0**	**0**	**16**	**2.06**	**1**	**3**	**0.85**
R10	0	0	6	7	3	16	3.81	3	5	0.75
R11	0	0	3	5	8	16	4.31	3	5	0.79
R12	0	0	1	3	12	16	4.69	3	5	0.60
R13	0	2	0	5	9	16	4.31	2	5	1.01
R14	2	0	5	5	4	16	3.56	1	5	1.26
R15	0	0	0	5	11	16	4.69	4	5	0.48
R16	0	0	0	4	12	16	4.75	4	5	0.45
R17	0	0	1	5	10	16	4.56	3	5	0.63
R18	**9**	**7**	**0**	**0**	**0**	**16**	**1.44**	**1**	**2**	**0.51**
R19	**7**	**7**	**2**	**0**	**0**	**16**	**1.69**	**1**	**3**	**0.70**
R20	**14**	**0**	**2**	**0**	**0**	**16**	**1.25**	**1**	**3**	**0.68**
R21	**4**	**12**	**0**	**0**	**0**	**16**	**1.75**	**1**	**2**	**0.45**
R22	**5**	**9**	**2**	**0**	**0**	**16**	**1.81**	**1**	**3**	**0.66**
R23	0	2	1	3	10	16	4.31	2	5	1.08
R24	0	0	1	4	11	16	4.63	3	5	0.62
R25	0	0	0	4	12	16	4.75	4	5	0.45
R26	0	0	1	0	15	16	4.88	3	5	0.50
R27	0	0	2	4	10	16	4.50	3	5	0.73
R28	0	0	0	1	15	16	4.94	4	5	0.25
R29	**3**	**11**	**2**	**0**	**0**	**16**	**1.94**	**1**	**3**	**0.57**
R30	0	1	5	3	7	16	4.00	2	5	1.03
R31	0	0	1	1	14	16	4.81	3	5	0.54
R32	0	0	4	0	12	16	4.50	3	5	0.89
R33	0	0	1	7	8	16	4.44	3	5	0.63
MFeR1	**10**	**6**	**0**	**0**	**0**	**16**	**1.38**	**1**	**2**	**0.50**
MFeR2	0	2	4	3	7	16	3.94	2	5	1.12
MFeR3	0	2	4	2	8	16	4.00	2	5	1.15
GVeR1	**9**	**6**	**1**	**0**	**0**	**16**	**1.50**	**1**	**3**	**0.63**
GVeR2	0	0	6	4	6	16	4.00	3	5	0.89
GVeR3	1	2	7	3	3	16	3.31	1	5	1.14
GVeR4	0	8	0	5	3	16	3.19	2	5	1.28
GVeR5	0	1	8	1	6	16	3.75	2	5	1.06
GVeR6	2	1	5	2	6	16	3.56	1	5	1.41
SIeR1	0	1	4	3	8	16	4.13	2	5	1.02
SIeR2	0	1	4	3	8	16	4.13	2	5	1.02
SIeR3	0	0	3	4	9	16	4.38	3	5	0.81
SIeR4	0	0	4	4	8	16	4.25	3	5	0.86
SIeR5	0	0	3	3	10	16	4.44	3	5	0.81
EGLOBAL	0	0	4	6	6	16	4.13	3	5	0.81
SAD1	0	1	5	4	6	16	3.94	2	5	1.00
SAD2	0	0	3	10	3	16	4.00	3	5	0.63
SDV1	0	1	5	2	8	16	4.06	2	5	1.06
SDV2	1	0	0	1	14	16	4.69	1	5	1.01
SDP1	2	0	13	1	0	16	2.81	1	4	0.75
SDP2	0	1	1	13	1	16	3.88	2	5	0.62
SBN1	1	0	1	5	9	16	4.31	1	5	1.08
SBN2	0	0	1	3	12	16	4.69	3	5	0.60
SBN3	0	0	2	13	1	16	3.94	3	5	0.44
SBN4	0	0	1	1	14	16	4.81	3	5	0.54
SBN5	0	0	2	0	14	16	4.75	3	5	0.68
SBN6	1	0	0	11	4	16	4.06	1	5	0.93
SBN7	0	1	1	12	2	16	3.94	2	5	0.68
SBN8	0	1	1	0	14	16	4.69	2	5	0.87
SBN9	0	1	1	5	9	16	4.38	2	5	0.89
SBN10	0	0	1	9	6	16	4.31	3	5	0.60

Bold represent items that are removed based on their mean relevance score

APPENDIX SIX

Instrument Reliability and Validation

APPENDIX 6A: ITEM ANALYSIS

Appendix 6A Item Analysis : Corrected Item-total Correlation Plotted in Decending Order

Summary for scale: Mean=121.508 Std.Dv.=21.9550 Valid N:150
Cronbach alpha: .933598 Standardized alpha: ---
ORGANIZATIONAL eREADINESS

	Mean if deleted	Var. if deleted	StDv. if deleted	Itm-Totl Correl.	Alpha if deleted
R10	118.6545	448.0783	21.1679	0.6353	0.9307
A5	119.0381	449.9676	21.2124	0.6232	0.9309
C7	118.1176	459.7610	21.4420	0.6094	0.9315
C1	118.8981	459.5021	21.4360	0.5937	0.9315
R14	119.1052	450.8248	21.2326	0.5796	0.9312
C3	119.1542	460.0772	21.4494	0.5780	0.9316
R9	118.0412	449.3250	21.1973	0.5761	0.9313
A9	119.4679	454.0107	21.3075	0.5757	0.9313
R8	118.6779	452.8819	21.2810	0.5679	0.9314
R4	117.7323	450.8551	21.2333	0.5656	0.9314
C2	118.4585	457.8758	21.3980	0.5628	0.9316
R23	118.7562	452.0443	21.2613	0.5559	0.9315
G7	118.7640	460.9226	21.4691	0.5475	0.9318
G3	118.8249	460.9624	21.4700	0.5457	0.9318
C5	119.2640	460.9654	21.4701	0.5408	0.9319
A4	119.3345	457.9023	21.3987	0.5362	0.9317
G1	118.6930	462.4856	21.5055	0.5308	0.9320
R1	119.0212	449.1330	21.1928	0.5292	0.9318
C4	119.0387	461.3297	21.4786	0.5128	0.9320
G5	118.8288	462.3597	21.5026	0.5079	0.9321
C8	118.1664	462.6393	21.5091	0.5029	0.9321
G2	118.7054	464.6989	21.5569	0.4991	0.9323
R7	118.9545	457.7992	21.3962	0.4952	0.9320
R15	118.6579	462.9494	21.5163	0.4936	0.9322
G6	118.7301	462.6290	21.5088	0.4915	0.9322
R2	119.0745	449.3045	21.1968	0.4903	0.9323
G8	119.0511	460.5833	21.4612	0.4903	0.9321
R6	118.8971	457.8831	21.3982	0.4846	0.9321
R17	119.5884	455.4918	21.3423	0.4686	0.9323
R12	118.9212	461.0575	21.4722	0.4530	0.9323
R22	119.2545	453.8791	21.3044	0.4497	0.9326
G10	118.3474	463.8058	21.5361	0.4455	0.9324
A10	119.2812	458.6569	21.4163	0.4340	0.9325
G9	119.0329	466.7831	21.6052	0.4256	0.9327
A7	119.3279	461.9992	21.4942	0.4086	0.9327
R21	118.9329	467.8913	21.6308	0.4085	0.9328
G4	118.7795	465.9279	21.5854	0.4026	0.9327
A2	119.1565	462.2883	21.5009	0.3915	0.9328
R20	118.7812	456.8115	21.3731	0.3868	0.9332
A3	119.1145	461.7956	21.4894	0.3786	0.9329
R11	118.6219	459.6838	21.4402	0.3779	0.9331
R19	118.6679	459.1162	21.4270	0.3730	0.9332
A8	**118.6812**	**462.3560**	**21.5025**	**0.3285**	**0.9335**
R3	**118.2479**	**456.4925**	**21.3657**	**0.3265**	**0.9344**
A1	**119.5545**	**463.7538**	**21.5349**	**0.3093**	**0.9336**
R13	**119.4545**	**471.5139**	**21.7144**	**0.1920**	**0.9341**

Summary for scale: Mean=34.6301 Std.Dv.=6.09097 Valid N:150
Cronbach alpha: .787239 Standardized alpha: ---
EXTERNAL eREADINESS

	Mean if deleted	Var. if deleted	StDv. if deleted	Itm-Totl Correl.	Alpha if deleted
GVER3	30.8463	30.5485	5.5271	0.5595	0.7589
GVER4	31.2356	30.9705	5.5651	0.4966	0.7651
SIER1	31.5227	31.2026	5.5859	0.4793	0.7670
GVER2	31.1572	30.6154	5.5331	0.4670	0.7678
SIER4	32.1435	30.7080	5.5415	0.4653	0.7680
SIER2	31.3501	29.8554	5.4640	0.4551	0.7698
SIER3	32.2501	31.4151	5.6049	0.4090	0.7743
MFER1	31.2835	31.3903	5.6027	0.4061	0.7747
GVER5	31.2788	31.9154	5.6494	0.4053	0.7746
MFER2	31.5828	31.3080	5.5954	0.3935	0.7763
GVER6	**31.6507**	**32.2222**	**5.6765**	**0.3390**	**0.7817**

Summary for scale: Mean=56.2036 Std.Dv.=8.31722 Valid N:150
Cronbach alpha: .888049 Standardized alpha: ---
eCOMMERCE SUCCESS

	Mean if deleted	Var. if deleted	StDv. if deleted	Itm-Totl Correl.	Alpha if deleted
SBN15	53.396	59.355	7.704	0.712	0.876
SBN9	53.457	60.685	7.790	0.680	0.877
SBN8	53.537	60.216	7.760	0.654	0.878
SBN6	53.421	60.957	7.807	0.652	0.878
SBN7	53.071	61.243	7.826	0.600	0.880
SBN14	52.746	60.908	7.804	0.572	0.880
SBN4	52.826	61.066	7.814	0.563	0.881
SBN11	53.945	62.571	7.910	0.562	0.881
SBN2	52.906	61.319	7.831	0.555	0.881
SBN1	52.768	61.567	7.846	0.529	0.882
SBN5	53.601	61.853	7.865	0.508	0.883
SBN10	53.045	62.871	7.929	0.455	0.884
SAD2	53.261	62.307	7.894	0.438	0.885
SBN13	53.906	63.100	7.944	0.420	0.885
SDV1	53.098	62.862	7.929	0.411	0.886
SDV2	53.251	63.182	7.949	0.407	0.886
SBN12	54.120	63.850	7.991	0.376	0.887
SDP1	52.025	63.684	7.980	0.363	0.887
SDP2	**53.286**	**65.464**	**8.091**	**0.261**	**0.890**

APPENDIX 6B: FACTOR ANALYSIS

Appendix 5B: Results of Factor Analysis
Factor Loadings (Varimax raw) (multimeansub.sta)
Extraction: Principal components
(Marked loadings are > .450000)
Organizational eReadiness: First iteration

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
A2	0.1412	**0.7520**	0.1532	0.0440	-0.0374	-0.1294
A3	0.2563	**0.7078**	-0.0152	0.1665	-0.0676	-0.0617
A4	0.1194	**0.7692**	0.0730	0.2364	0.1016	0.1277
A5	0.2162	**0.6109**	0.1016	0.1615	0.3287	0.3067
A7	-0.1728	**0.6342**	0.0836	0.1673	0.2027	0.2560
A9	0.1467	**0.6853**	0.1796	0.1388	0.3452	0.0362
A10	-0.0387	**0.6416**	0.0406	0.0645	0.4239	0.0231
R1	0.2700	0.2620	**0.6400**	0.2185	-0.0342	-0.0622
R2	0.1045	0.1340	**0.6613**	0.2328	0.1713	-0.1288
R4	0.4076	0.3064	0.2243	0.0226	0.1864	0.3803
R6	0.0756	0.0938	**0.7868**	0.1136	0.0864	0.1633
R7	0.1655	0.0693	**0.7505**	-0.0563	0.2692	0.1193
R8	0.1137	0.0897	**0.7593**	0.1402	0.2812	0.1628
R9	0.0064	0.3258	0.2704	0.2062	0.3943	**0.4736**
R10	0.2215	0.2581	0.2390	0.1977	**0.4510**	**0.4508**
R11	0.1341	0.0409	0.3370	0.1273	0.0326	**0.4832**
R12	0.3541	0.0002	0.3664	0.0398	0.1059	**0.4582**
R14	0.2690	0.1802	0.2146	**0.6479**	0.0821	0.2201
R15	0.4024	0.1210	0.1003	0.2068	0.4238	0.1989
R17	0.1411	0.2450	0.1732	**0.7917**	-0.0585	-0.0081
R19	0.0476	0.0770	0.0090	**0.6088**	-0.0179	0.4643
R20	-0.1546	0.1246	0.1713	**0.6365**	0.2479	0.1302
R21	0.4438	-0.0056	0.1795	0.2944	0.1146	0.1913
R22	0.2289	0.1328	0.0463	**0.7412**	0.2399	-0.2192
R23	0.2401	0.1057	0.0472	**0.6376**	0.2702	0.2741
C1	0.2987	0.3028	0.1712	0.0298	**0.7082**	0.2024
C2	0.3888	0.3266	0.2618	0.0464	**0.6095**	-0.1444
C3	0.2400	0.2292	0.2402	0.1360	**0.6431**	0.2140
C4	0.3726	0.0853	0.0984	0.2481	**0.6235**	-0.1142
C5	0.4025	-0.0480	0.1835	0.1601	**0.7326**	0.0217
C7	**0.5504**	0.2742	0.2895	-0.0572	0.4369	0.1864
C8	**0.5732**	0.2634	0.3134	-0.0832	0.2082	0.0619
G1	**0.7582**	0.1582	-0.0075	0.0563	0.3326	0.0608
G2	**0.6653**	0.0296	0.0828	0.0990	0.3153	0.1451
G3	**0.7273**	0.0496	0.1481	0.2235	0.2948	-0.0924
G4	**0.4973**	-0.0729	0.2232	0.0611	0.1781	0.3353
G5	**0.5763**	-0.1164	0.4457	0.1599	0.1350	0.2416
G6	**0.6889**	0.1855	0.1405	0.1537	-0.0641	0.3477
G7	**0.6859**	0.2250	0.0985	0.1243	0.2575	0.0555
G8	**0.6663**	0.0347	0.0976	0.2507	0.2755	-0.0633
G9	**0.5409**	0.0286	**0.4633**	0.1829	0.0119	-0.0699
G10	**0.6422**	0.1698	0.1045	0.0916	0.2103	-0.0696
Expl.Var	6.7256	4.4169	4.1893	3.6632	4.4388	2.2837
Prp.Totl	0.1601	0.1052	0.0997	0.0872	0.1057	0.0544

Factor Loadings (Varimax raw) (multimeansub.sta)
Extraction: Principal components
(Marked loadings are > .450000)
Organizational eReadiness: Second iteration

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
A2	0.1473	**0.7308**	0.0165	0.0398	-0.0504	0.1574
A3	0.2497	**0.7073**	-0.0800	0.1361	-0.0800	0.0577
A4	0.1265	**0.7809**	0.0704	0.2449	0.0582	0.1119
A5	0.2344	**0.6465**	0.2396	0.1895	0.2799	-0.0039
A7	-0.1414	**0.6477**	0.1827	0.1855	0.1999	0.0141
A9	0.1353	**0.7002**	0.1157	0.1199	0.3437	0.1492
A10	-0.0222	**0.6478**	0.0169	0.0611	0.4106	0.0672
R1	0.2289	0.2165	0.2657	0.1465	-0.0158	**0.7612**
R2	0.0457	0.0807	0.2304	0.1631	0.2164	**0.8243**
R6	0.0683	0.0948	**0.7159**	0.1426	0.0769	0.3318
R7	0.1721	0.0770	**0.6911**	-0.0516	0.2731	0.2975
R8	0.1174	0.1012	**0.6791**	0.1392	0.2600	0.3761
R9	0.0600	0.3458	**0.4868**	0.3072	0.3221	-0.0652
R11	0.1814	0.0915	**0.5661**	0.1494	-0.0338	-0.0283
R12	0.3920	0.0470	**0.5623**	0.0296	0.0718	0.0328
R14	0.2972	0.1898	0.2476	**0.6730**	0.0110	0.1397
R17	0.1363	0.2160	0.0243	**0.7958**	-0.0777	0.2842
R20	-0.1365	0.1506	0.2811	**0.6862**	0.2383	-0.1240
R22	0.2226	0.1083	-0.1352	**0.7330**	0.2451	0.1552
R23	0.2670	0.1425	0.1705	**0.6187**	0.2272	0.0020
C1	0.3117	0.3337	0.2373	0.0411	**0.6883**	0.0602
C2	0.3833	0.3079	0.0820	0.0442	**0.6176**	0.2637
C3	0.2667	0.2507	0.2975	0.1632	**0.6049**	0.1061
C4	0.3859	0.0749	0.0093	0.2545	**0.6187**	0.1140
C5	0.4013	-0.0272	0.1716	0.1695	**0.7247**	0.0661
C7	**0.5602**	0.2814	0.3232	-0.0510	**0.4532**	0.1176
C8	**0.5760**	0.2535	0.2466	-0.1031	0.2255	0.2097
G1	**0.7701**	0.1562	0.0005	0.0561	0.3146	0.0493
G2	**0.6672**	0.0579	0.1792	0.1143	0.2906	-0.0258
G3	**0.7010**	0.0350	0.0049	0.1839	0.3326	0.2120
G4	**0.5008**	-0.0587	**0.5331**	0.1043	0.1453	0.0516
G5	**0.5836**	-0.1192	**0.4491**	0.1879	0.1098	0.2393
G6	**0.7150**	0.2136	0.3172	0.1661	-0.1145	-0.0658
G7	**0.7248**	0.2121	0.1120	0.1430	0.2265	0.0442
G8	**0.6984**	0.0170	0.0441	0.2667	0.2439	0.0985
G10	**0.6310**	0.1279	-0.0780	0.0847	0.2057	0.3017
Expl.Var	6.0471	4.3103	3.5637	3.2131	3.7570	2.1870
Prp.Totl	0.1680	0.1197	0.0990	0.0893	0.1044	0.0608

Factor Loadings (Varimax raw) (multimeansub.sta)
Extraction: Principal components
(Marked loadings are > .450000)
Organizational eReadiness: Last iteration

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
A2	0.1626	**0.7226**	0.0291	0.0427	-0.0723	0.1675
A3	0.2549	**0.7070**	-0.0832	0.1311	-0.0856	0.0826
A4	0.1374	**0.7836**	0.0767	0.2361	0.0534	0.1104
A5	0.2160	**0.6588**	0.2211	0.1916	0.2900	-0.0038
A7	-0.1410	**0.6604**	0.1739	0.1815	0.2029	-0.0034
A9	0.1500	**0.6988**	0.1318	0.1148	0.3290	0.1443
A10	-0.0157	**0.6579**	0.0160	0.0525	0.4012	0.0716
R1	0.2192	0.2048	0.2847	0.1502	-0.0133	**0.7628**
R2	0.0264	0.0833	0.2359	0.1618	0.2245	**0.8191**
R6	0.0706	0.0809	**0.7449**	0.1465	0.0707	0.3162
R7	0.1730	0.0627	**0.7234**	-0.0470	0.2616	0.2869
R8	0.0895	0.1041	**0.6763**	0.1457	0.2676	0.3701
R9	0.0556	0.3514	**0.4850**	0.3019	0.3267	-0.0684
R11	0.1608	0.0934	**0.5565**	0.1474	-0.0171	-0.0156
R12	0.4032	0.0169	**0.6029**	0.0497	0.0566	0.0067
R14	0.2871	0.1890	0.2416	**0.6735**	0.0261	0.1380
R17	0.1293	0.2182	0.0126	**0.7950**	-0.0680	0.2904
R20	-0.1338	0.1450	0.2695	**0.7034**	0.2281	-0.1236
R22	0.2441	0.0936	-0.1208	**0.7373**	0.2273	0.1595
R23	0.2689	0.1328	0.1716	**0.6300**	0.2224	0.0051
C1	0.3140	0.3357	0.2497	0.0343	**0.6861**	0.0602
C2	0.3797	0.2996	0.0929	0.0578	**0.5967**	0.2738
C3	0.2426	0.2729	0.2823	0.1469	**0.6271**	0.1087
C4	0.3972	0.0780	0.0262	0.2341	**0.6247**	0.1142
C5	0.3778	-0.0101	0.1588	0.1568	**0.7450**	0.0775
C8	**0.5611**	0.2399	0.2578	-0.0819	0.2143	0.2150
G1	**0.7869**	0.1355	0.0378	0.0528	0.3068	0.0585
G2	**0.6642**	0.0477	0.1955	0.1155	0.2964	-0.0220
G3	**0.6721**	0.0449	-0.0075	0.1752	0.3571	0.2344
G6	**0.7133**	0.2028	0.3357	0.1588	-0.0989	-0.0636
G7	**0.7413**	0.1885	0.1502	0.1488	0.2108	0.0413
G8	**0.7191**	0.0074	0.0825	0.2453	0.2524	0.0868
G10	**0.6497**	0.1182	-0.0372	0.0643	0.2033	0.3019
Expl.Var	5.1582	4.2151	3.2925	3.1609	3.5540	2.1132
Prp.Totl	0.1563	0.1277	0.0998	0.0958	0.1077	0.0640

APPENDIX 6B: FACTOR ANAYSIS

Appendix 6B: Results of Factor Analysis
Factor Loadings (Varimax raw) (multimcansub.sta)
Extraction: Principal components
(Marked loadings are > .45)
External cReadiness: First Iteration

	Factor 1	Factor 2	Factor 3
MFER1	0.1370907	**0.8268686**	0.0560424
MFER2	0.1373713	**0.8618335**	0.0404306
GVER2	**0.8636583**	0.2219721	-0.055501
GVER3	**0.9167344**	0.1477445	0.0926102
GVER4	**0.7376168**	-0.121798	0.3815036
GVER5	**0.5905774**	-0.080189	0.2905775
SIER1	0.1511937	0.3133596	**0.5363572**
SIER2	0.2096244	0.028556	**0.7546862**
SIER3	-0.053516	0.2015041	**0.7513257**
SIER4	0.0697928	0.246459	**0.5879414**
Expl.Var	2.3270231	2.0041225	2.1483237
Prp.Totl	0.2327023	0.2004122	0.2148324

Factor Loadings (Varimax raw) (multimcansub.sta)
Extraction: Principal components
(Marked loadings are > .650000)
eCommerce Success: First Iteration

	Factor 1	Factor 2	Factor 3	Factor 4
SAD2	0.3739256	0.2789363	0.1644008	0.1676539
SDV1	0.0596073	0.0961477	**0.873096**	0.1872365
SDV2	0.1623158	0.0474203	**0.8485188**	0.1096681
SDP2	0.3359029	0.0668825	0.533418	-0.295196
SBN1	0.0489773	0.3864672	0.2099635	**0.6564099**
SBN2	0.2838594	0.3696294	0.2827325	0.3792238
SBN4	0.2370333	-0.013966	0.1925303	**0.8402267**
SBN5	**0.8119456**	0.0045733	0.1686581	-0.027809
SBN6	**0.8375735**	0.0571549	0.1629222	0.1531946
SBN7	**0.788358**	-0.064301	0.0855001	0.2661726
SBN8	0.3390259	0.3457499	0.2492052	0.533221
SBN9	**0.7205872**	0.2992558	0.1791036	0.1400498
SBN10	0.1822783	0.1149645	-0.050672	**0.7245329**
SBN11	0.4520672	0.5106948	-0.007381	0.2352875
SBN12	0.0384232	**0.8274625**	0.034726	0.1189665
SBN13	0.0767162	**0.8753817**	0.1081679	0.0589073
SBN14	0.5858367	0.2891165	-0.158303	0.3762588
SBN15	**0.6399756**	0.2504295	0.0455597	0.4454942
Expl.Var	4.0359133	2.4677855	2.154078	2.7799945
Prp.Totl	0.2242174	0.1370992	0.119671	0.1544441

Factor Loadings (Varimax raw) (multimcansub.sta)
Extraction: Principal components
(Marked loadings are > .650000)
eCommerce Success: Second Iteration

	Factor 1	Factor 2	Factor 3	Factor 4
SDV1	0.071985	0.1013486	**0.904833**	0.157828
SDV2	0.203883	0.0667037	**0.900487**	0.036935
SBN1	0.042651	0.3420614	0.159715	**0.712013**
SBN4	0.242284	-0.008578	0.231024	**0.816302**
SBN5	**0.832086**	0.0058789	0.170467	-0.052488
SBN6	**0.848931**	0.0622669	0.127567	0.182819
SBN7	**0.811252**	-0.033028	0.076776	0.257742
SBN9	**0.741301**	0.300347	0.155625	0.150102
SBN10	0.166201	0.105317	-0.037748	**0.786357**
SBN12	0.059307	**0.8708363**	0.051868	0.146046
SBN13	0.092528	**0.89997**	0.113984	0.059189
SBN15	**0.606376**	0.213155	0.036467	**0.473575**
Expl.Var	3.135373	1.85184	1.802364	2.192189
Prp.Totl	0.261281	0.15432	0.150197	0.182682

Factor Loadings (Varimax raw) (multimcansub.sta)
Extraction: Principal components
(Marked loadings are > .650000)
eCommerce Success: Third Iteration

		Factor 1	Factor 2	Factor 3	Factor 4
1	SDV1	0.069445	0.100018	**0.909587**	0.148441
2	SDV2	0.213948	0.067952	**0.893823**	0.040759
3	SBN1	0.028615	0.34507	0.172062	**0.702268**
4	SBN4	0.237843	-0.00253	0.232565	**0.81874**
5	SBN5	**0.83909**	0.012581	0.161219	-0.040172
6	SBN6	**0.841573**	0.068235	0.130875	0.182606
7	SBN7	**0.821389**	-0.023194	0.065562	0.276178
8	SBN9	**0.747762**	0.308097	0.144842	0.163782
9	SBN10	0.178276	0.114666	-0.053232	**0.808403**
10	SBN12	0.060431	**0.873701**	0.047027	0.150174
11	SBN13	0.084131	**0.900288**	0.116789	0.052661
	Expl.Var	2.796642	1.820997	1.797042	2.004108
	Prp.Totl	0.25424	0.165545	0.163367	0.182192

APPENDIX 6C: CORRELATION MATRIX

Appendix 6C
Correlations

	A2	A3	A4	A5	A7	A9	A10	R1	R2	R6	R7	R8	R9	R11	R12	R14	R17	R20	R22	R23	C1	C2	C3	C4	C5	C8	G1	G2	G3	G6	G7	G8	G10
A2	**1.00**	**0.68**	**0.52**	**0.36**	**0.32**	**0.46**	**0.40**	0.25	0.13	0.16	0.20	0.21	0.23	0.19	0.09	0.20	0.20	0.21	0.22	0.17	0.22	0.34	0.23	0.21	0.06	0.33	0.22	0.09	0.17	0.16	0.24	0.13	0.21
A3	**0.68**	**1.00**	**0.50**	**0.39**	**0.34**	**0.42**	**0.37**	0.21	0.10	0.06	0.07	0.19	0.25	0.16	-0.01	0.17	0.30	0.17	0.27	0.22	0.23	0.32	0.20	0.22	0.11	0.26	0.27	0.18	0.26	0.31	0.22	0.22	0.18
A4	**0.52**	**0.50**	**1.00**	**0.67**	**0.54**	**0.62**	**0.47**	0.33	0.25	0.21	0.16	0.20	0.37	0.20	0.12	0.37	0.38	0.26	0.27	0.34	0.42	0.34	0.38	0.21	0.14	0.23	0.22	0.21	0.17	0.28	0.33	0.21	0.36
A5	**0.36**	**0.39**	**0.67**	**1.00**	**0.59**	**0.54**	**0.47**	0.31	0.27	0.30	0.22	0.26	0.49	0.18	0.26	0.39	0.36	0.30	0.21	0.36	0.60	0.50	0.48	0.31	0.33	0.43	0.36	0.40	0.35	0.37	0.38	0.26	0.24
A7	**0.32**	**0.34**	**0.54**	**0.59**	**1.00**	**0.50**	**0.43**	0.24	0.23	0.18	0.16	0.16	0.42	0.05	0.22	0.26	0.29	0.27	0.14	0.22	0.31	0.19	0.36	0.18	0.14	0.17	0.09	0.12	0.09	0.05	0.18	0.01	0.01
A9	**0.46**	**0.42**	**0.62**	**0.54**	**0.50**	**1.00**	**0.73**	0.31	0.28	0.28	0.32	0.35	0.36	0.12	0.18	0.39	0.28	0.24	0.27	0.28	0.52	0.51	0.42	0.32	0.39	0.32	0.31	0.28	0.27	0.37	0.33	0.29	0.32
A10	**0.40**	**0.37**	**0.47**	**0.47**	**0.43**	**0.73**	**1.00**	0.21	0.18	0.12	0.19	0.28	0.35	0.05	0.09	0.24	0.19	0.18	0.26	0.15	0.42	0.37	0.39	0.31	0.29	0.19	0.24	0.15	0.23	0.17	0.25	0.11	0.10
R1	0.25	0.21	0.33	0.31	0.24	0.31	0.21	**1.00**	**0.77**	0.40	0.36	0.49	0.29	0.17	0.31	0.37	0.35	0.15	0.19	0.25	0.22	0.31	0.33	0.21	0.23	0.42	0.29	0.25	0.36	0.35	0.28	0.30	0.27
R2	0.13	0.10	0.25	0.27	0.23	0.28	0.18	**0.77**	**1.00**	0.37	0.35	0.50	0.24	0.23	0.27	0.32	0.34	0.14	0.22	0.24	0.37	0.33	0.33	0.30	0.29	0.28	0.23	0.24	0.26	0.04	0.15	0.21	0.30
R6	0.16	0.06	0.21	0.30	0.18	0.28	0.12	0.40	0.37	**1.00**	**0.79**	**0.62**	**0.35**	**0.32**	**0.36**	0.34	0.27	0.27	0.16	0.27	0.30	0.30	0.33	0.15	0.24	0.31	0.09	0.18	0.21	0.30	0.29	0.22	0.20
R7	0.20	0.07	0.16	0.22	0.16	0.32	0.19	0.36	0.35	**0.79**	**1.00**	**0.65**	**0.35**	**0.34**	**0.40**	0.18	0.13	0.19	0.11	0.21	0.40	0.44	0.43	0.29	0.36	0.37	0.25	0.31	0.31	0.32	0.37	0.25	0.25
R8	0.21	0.19	0.20	0.26	0.16	0.35	0.28	0.49	0.50	**0.62**	**0.65**	**1.00**	**0.49**	**0.37**	**0.43**	0.35	0.23	0.33	0.22	0.24	0.38	0.42	0.45	0.32	0.41	0.34	0.20	0.30	0.29	0.32	0.26	0.31	0.18
R9	0.23	0.25	0.37	0.49	0.42	0.36	0.35	0.29	0.24	**0.35**	**0.35**	**0.49**	**1.00**	**0.36**	**0.30**	0.38	0.28	0.42	0.28	0.33	0.46	0.33	0.44	0.36	0.37	0.28	0.31	0.22	0.11	0.27	0.29	0.26	0.25
R11	0.19	0.16	0.20	0.18	0.05	0.12	0.05	0.17	0.23	**0.32**	**0.34**	**0.37**	**0.36**	**1.00**	**0.34**	0.26	0.14	0.16	0.12	0.26	0.27	0.18	0.20	0.22	0.16	0.19	0.18	0.17	0.18	0.24	0.18	0.11	0.17
R12	0.09	-0.01	0.12	0.26	0.22	0.18	0.09	0.31	0.27	**0.36**	**0.40**	**0.43**	**0.30**	**0.34**	**1.00**	0.31	0.11	0.11	0.13	0.27	0.33	0.25	0.24	0.27	0.28	0.38	0.43	0.46	0.25	0.41	0.34	0.31	0.23
R14	0.20	0.17	0.37	0.39	0.26	0.39	0.24	0.37	0.32	0.34	0.18	0.35	0.38	0.26	0.31	**1.00**	**0.65**	**0.44**	**0.46**	**0.45**	0.27	0.28	0.34	0.32	0.34	0.22	0.31	0.29	0.37	0.47	0.41	0.38	0.28
R17	0.20	0.30	0.38	0.36	0.29	0.28	0.19	0.35	0.34	0.27	0.13	0.23	0.28	0.14	0.11	**0.65**	**1.00**	**0.40**	**0.61**	**0.51**	0.13	0.21	0.23	0.26	0.13	0.09	0.19	0.14	0.30	0.26	0.24	0.26	0.25
R20	0.21	0.17	0.26	0.30	0.27	0.24	0.18	0.15	0.14	0.27	0.19	0.33	0.42	0.16	0.11	**0.44**	**0.40**	**1.00**	**0.49**	**0.45**	0.18	0.15	0.27	0.26	0.29	0.13	0.04	0.18	0.10	0.09	0.13	0.20	-0.12
R22	0.22	0.27	0.27	0.21	0.14	0.27	0.26	0.19	0.22	0.16	0.11	0.22	0.28	0.12	0.13	**0.46**	**0.61**	**0.49**	**1.00**	**0.55**	0.26	0.43	0.23	0.43	0.32	0.21	0.30	0.21	0.39	0.21	0.39	0.38	0.34
R23	0.17	0.22	0.34	0.36	0.22	0.28	0.15	0.25	0.24	0.27	0.21	0.24	0.33	0.26	0.27	**0.45**	**0.51**	**0.45**	**0.55**	**1.00**	0.47	0.36	0.47	0.26	0.30	0.24	0.31	0.44	0.34	0.31	0.33	0.36	0.32
C1	0.22	0.23	0.42	0.60	0.31	0.52	0.42	0.22	0.37	0.30	0.40	0.38	0.46	0.27	0.33	0.27	0.13	0.18	0.26	0.47	**1.00**	**0.72**	**0.73**	**0.48**	**0.59**	0.46	0.51	0.41	0.43	0.33	0.46	0.43	0.44
C2	0.34	0.32	0.34	0.50	0.19	0.51	0.37	0.31	0.33	0.30	0.44	0.42	0.33	0.18	0.25	0.28	0.21	0.15	0.43	0.36	**0.72**	**1.00**	**0.56**	**0.50**	**0.54**	0.51	0.49	0.41	0.56	0.25	0.49	0.43	0.50
C3	0.23	0.20	0.38	0.48	0.36	0.42	0.39	0.33	0.33	0.33	0.43	0.45	0.44	0.20	0.24	0.34	0.23	0.27	0.23	0.47	**0.73**	**0.56**	**1.00**	**0.50**	**0.56**	0.37	0.41	0.40	0.42	0.37	0.39	0.46	0.39
C4	0.21	0.22	0.21	0.31	0.18	0.32	0.31	0.21	0.30	0.15	0.29	0.32	0.36	0.22	0.27	0.32	0.26	0.26	0.43	0.26	**0.48**	**0.50**	**0.50**	**1.00**	**0.71**	0.36	0.55	0.40	0.55	0.25	0.51	0.50	0.41
C5	0.06	0.11	0.14	0.33	0.14	0.39	0.29	0.23	0.29	0.24	0.36	0.41	0.37	0.16	0.28	0.34	0.13	0.29	0.32	0.30	**0.59**	**0.54**	**0.56**	**0.71**	**1.00**	0.45	0.49	0.51	0.62	0.32	0.45	0.50	0.37
C8	0.33	0.26	0.23	0.43	0.17	0.32	0.19	0.42	0.28	0.31	0.37	0.34	0.28	0.19	0.38	0.22	0.09	0.13	0.21	0.24	0.46	0.51	0.37	0.36	0.45	**1.00**	**0.52**	**0.41**	**0.45**	**0.43**	**0.58**	**0.43**	**0.41**
G1	0.22	0.27	0.22	0.36	0.09	0.31	0.24	0.29	0.23	0.09	0.25	0.20	0.31	0.18	0.43	0.31	0.19	0.04	0.30	0.31	0.51	0.49	0.41	0.55	0.49	**0.52**	**1.00**	**0.71**	**0.64**	**0.49**	**0.64**	**0.60**	**0.55**
G2	0.09	0.18	0.21	0.40	0.12	0.28	0.15	0.25	0.24	0.18	0.31	0.30	0.22	0.17	0.46	0.29	0.14	0.18	0.21	0.44	0.41	0.41	0.40	0.40	0.51	**0.41**	**0.71**	**1.00**	**0.58**	**0.45**	**0.51**	**0.54**	**0.42**
G3	0.17	0.26	0.17	0.35	0.09	0.27	0.23	0.36	0.26	0.21	0.31	0.29	0.11	0.18	0.25	0.37	0.30	0.10	0.39	0.34	0.43	0.56	0.42	0.55	0.62	**0.45**	**0.64**	**0.58**	**1.00**	**0.50**	**0.58**	**0.53**	**0.47**
G6	0.16	0.31	0.28	0.37	0.05	0.37	0.17	0.35	0.04	0.30	0.32	0.32	0.27	0.24	0.41	0.47	0.26	0.09	0.21	0.31	0.33	0.25	0.37	0.25	0.32	**0.43**	**0.49**	**0.45**	**0.50**	**1.00**	**0.58**	**0.58**	**0.37**
G7	0.24	0.22	0.33	0.38	0.18	0.33	0.25	0.28	0.15	0.29	0.37	0.26	0.29	0.18	0.34	0.41	0.24	0.13	0.39	0.33	0.46	0.49	0.39	0.51	0.45	**0.58**	**0.64**	**0.51**	**0.58**	**0.58**	**1.00**	**0.63**	**0.55**
G8	0.13	0.22	0.21	0.26	0.01	0.29	0.11	0.30	0.21	0.22	0.25	0.31	0.26	0.11	0.31	0.38	0.26	0.20	0.38	0.36	0.43	0.43	0.46	0.50	0.50	**0.43**	**0.60**	**0.54**	**0.53**	**0.58**	**0.63**	**1.00**	**0.57**
G10	0.21	0.18	0.36	0.24	0.01	0.32	0.10	0.27	0.30	0.20	0.25	0.18	0.25	0.17	0.23	0.28	0.25	-0.12	0.34	0.32	0.44	0.50	0.39	0.41	0.37	**0.41**	**0.55**	**0.42**	**0.47**	**0.37**	**0.55**	**0.57**	**1.00**
K Value	2	0	0	9	2	2	2	0	0	4	8	6	13	0	9	1	0	0	0	2	3	3	0	3	1	5	2	3	3	2	0	3	4
Max K	13	13	13	13	13	13	13	13	13	13	13	13	13	13	13	14	14	14	14	14	14	14	14	14	14	12	12	12	12	12	12	12	12
No. of comparisons	26	26	26	26	26	26	26	91	91	39	27	27	27	27	27	28	28	26	26	28	28	26	26	26	28	25	25	25	25	25	25	25	25

APPENDIX 6C: CORRELATION MATRIX

Appendix 6C
Correlations

	SDV1	SDV2	SBN1	SBN4	SBN10	SBN5	SBN6	SBN7	SBN9	SBN12	SBN13
SDV1	**1.00**	**0.71**	0.28	0.32	0.10	0.19	0.23	0.20	0.22	0.16	0.22
SDV2	**0.71**	**1.00**	0.18	0.27	0.10	0.32	0.27	0.21	0.36	0.14	0.16
SBN1	0.28	0.18	**1.00**	**0.50**	**0.41**	-0.01	0.29	0.23	0.29	0.34	0.33
SBN4	0.32	0.27	**0.50**	**1.00**	**0.60**	0.26	0.36	0.42	0.27	0.19	0.14
SBN10	0.10	0.10	**0.41**	**0.60**	**1.00**	0.18	0.23	0.29	0.32	0.25	0.16
SBN5	0.19	0.32	-0.01	0.26	0.18	**1.00**	**0.70**	**0.54**	**0.50**	0.12	0.09
SBN6	0.23	0.27	0.29	0.36	0.23	**0.70**	**1.00**	**0.67**	**0.57**	0.18	0.12
SBN7	0.20	0.21	0.23	0.42	0.29	**0.54**	**0.67**	**1.00**	**0.68**	0.05	0.10
SBN9	0.22	0.36	0.29	0.27	0.32	**0.50**	**0.57**	**0.68**	**1.00**	0.25	0.36
SBN12	0.16	0.14	0.34	0.19	0.25	0.12	0.18	0.05	0.25	**1.00**	**0.66**
SBN13	0.22	0.16	0.33	0.14	0.16	0.09	0.12	0.10	0.36	**0.66**	**1.00**
K-count	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Max k	4.00	4.00	4.00	4.00	4.00	3.00	3.00	3.00	3.00	4.00	4.00
No of Comparison	9.00	9.00	8.00	8.00	8.00	7.00	7.00	7.00	7.00	9.00	9.00

	MFER1	MFER2	GVER2	GVER3	GVER4	GVER5	SIER1	SIER2	SIER3	SIER4
MFER1	**1.00**	**0.64**	0.21	0.24	0.04	0.15	0.21	0.19	0.12	0.38
MFER2	**0.64**	**1.00**	0.26	0.19	0.10	0.08	0.28	0.09	0.17	0.41
GVER2	0.21	0.26	**1.00**	**0.79**	**0.45**	**0.35**	0.22	0.15	0.09	0.18
GVER3	0.24	0.19	**0.79**	**1.00**	**0.59**	**0.28**	0.24	0.24	0.11	0.23
GVER4	0.04	0.10	**0.45**	**0.59**	**1.00**	**0.41**	0.19	0.42	0.16	0.20
GVER5	0.15	0.08	**0.35**	**0.28**	**0.41**	**1.00**	0.27	0.08	0.24	0.14
SIER1	0.21	0.28	0.22	0.24	0.19	0.27	**1.00**	**0.34**	**0.34**	**0.32**
SIER2	0.19	0.09	0.15	0.24	0.42	0.08	**0.34**	**1.00**	**0.44**	**0.30**
SIER3	0.12	0.17	0.09	0.11	0.16	0.24	**0.34**	**0.44**	**1.00**	**0.45**
SIER4	0.38	0.41	0.18	0.23	0.20	0.14	**0.32**	**0.30**	**0.45**	**1.00**
K count	0	0	0	0	1	0	0	1	0	2
Max K	4	4	3	3	3	3	3	3	3	3
No of Comparison	8	8	6	6	6	6	6	6	6	6

APPENDIX 6D: FINAL RELIABILITY ASSESSMENT

Number of items in scale: 33
Number of items with zero variance: 0
Number of valid cases: 150
Number of cases with missing data: 0
Missing data were deleted: casewise
Cronbach's alpha: .930712137

	Mean if deleted	Var. if deleted	StDv. If deleted	Itm-Totl Correl.	Alpha if deleted
A2	82.8967	263.8047	16.2421	0.4192	0.9185
A3	82.8547	263.5334	16.2337	0.4008	0.9188
A4	83.0747	260.6180	16.1437	0.5628	0.9168
A5	82.7782	255.4135	15.9817	0.6208	0.9158
A7	83.0680	264.0534	16.2497	0.4212	0.9185
A9	83.2080	257.9638	16.0613	0.5900	0.9163
A10	83.0214	261.5401	16.1722	0.4436	0.9183
R1	82.7614	255.1709	15.9741	0.5145	0.9176
R2	82.8147	255.6077	15.9877	0.4677	0.9186
R6	82.6373	261.2332	16.1627	0.4868	0.9177
R7	82.6947	261.0664	16.1576	0.5011	0.9175
R8	82.4181	257.5099	16.0471	0.5684	0.9165
R9	81.7814	255.3164	15.9786	0.5616	0.9166
R11	82.3621	263.6957	16.2387	0.3461	0.9199
R12	82.6614	264.8158	16.2732	0.4136	0.9186
R14	82.8453	256.2729	16.0085	0.5701	0.9165
R17	83.3286	259.0207	16.0941	0.4807	0.9179
R20	82.5214	259.7784	16.1176	0.4016	0.9194
R22	82.9947	257.2477	16.0389	0.4739	0.9182
R23	82.4964	257.5996	16.0499	0.5341	0.9170
C1	82.6383	262.8041	16.2112	0.5852	0.9169
C2	82.1987	261.4286	16.1688	0.5597	0.9169
C3	82.8944	263.3457	16.2279	0.5648	0.9171
C4	82.7789	264.0088	16.2484	0.5112	0.9176
C5	83.0041	264.1993	16.2542	0.5199	0.9175
C8	81.9066	265.2374	16.2861	0.4914	0.9178
G1	82.4332	265.0983	16.2818	0.5202	0.9176
G2	82.4456	266.9214	16.3377	0.4809	0.9181
G3	82.5651	264.3570	16.2591	0.5178	0.9175
G6	82.4703	265.7193	16.3009	0.4592	0.9181
G7	82.5041	263.7013	16.2389	0.5463	0.9172
G8	82.7912	263.1547	16.2220	0.4989	0.9176
G10	82.0875	266.0409	16.3108	0.4370	0.9183

Number of items in scale: 10
Number of items with zero variance: 0
Number of valid cases: 150
Number of cases with missing data: 0
Missing data were deleted: casewise
Cronbach's alpha: .785474805

	Mean if deleted	Var. if deleted	StDv. If deleted	Itm-Totl Correl.	Alpha if deleted
MFER1	28.2828	27.5683	5.2506	0.4165	0.7718
MFER2	28.5931	27.4413	5.2384	0.4130	0.7725
GVER2	28.1655	27.2140	5.2167	0.4418	0.7687
GVER3	27.8621	26.9603	5.1923	0.5573	0.7556
GVER4	28.2345	27.3933	5.2339	0.4828	0.7639
GVER5	28.2690	28.4449	5.3334	0.3791	0.7758
SIER1	28.5379	27.8348	5.2759	0.4510	0.7677
SIER2	28.3035	25.8390	5.0832	0.5055	0.7605
SIER3	29.2414	27.7555	5.2684	0.4022	0.7735
SIER4	29.1586	26.6990	5.1671	0.5042	0.7607

SUMMARY STATISTICS FOR SCALE-eCommerce Success
Number of items in scale: 11
Number of items with zero variance: 0
Number of valid cases: 79
Number of cases with missing data: 71
Missing data were deleted: casewise
Cronbach's alpha: .825522189

	Mean if deleted	Var. if deleted	StDv. If deleted	Itm-Totl Correl.	Alpha if deleted
SDV1	28.6582	37.1870	6.0981	0.4325	0.8112
SDV2	28.7722	37.1380	6.0941	0.4600	0.8084
SBN1	28.2658	36.6002	6.0498	0.5079	0.8039
SBN4	28.3798	35.8305	5.9859	0.5398	0.8007
SBN5	29.1392	37.2085	6.0999	0.4581	0.8086
SBN6	28.9494	36.0987	6.0082	0.6059	0.7953
SBN7	28.6456	36.2035	6.0169	0.5636	0.7987
SBN9	29.0000	35.3671	5.9470	0.6534	0.7905
SBN10	28.5823	37.4078	6.1162	0.4483	0.8094
SBN12	29.6456	38.5832	6.2115	0.3589	0.8173
SBN13	29.4304	38.4983	6.2047	0.3468	0.8188

APPENDIX SEVEN

Current eCommerce Implementation in South Africa

APPENDIX 7A: Currently Implemented eCommerce Technologies

APPENDIX 7A CURRENTLY IMPLEMENTED eCOMMERCE TECHNOLOGIES

Table 7A.1 Distribution of Currently Implemented eCommerce Technologies Within and Across Sectors

Sector		Supplier Relationship Management	Partners Relationship Management	Digital signatures	Customer Relationship Management	Secured Electronic Transactio	Customers paymentby credit card	Enterprise Resource Planning	Extranet	Call Center	Electronic document interchang	Non Internet based e-	Dial-up access to Internet	Intranet	Electronic Funds Transfer	Firewalls	Dedicated line access to Internet	Website	Local Area Network	Registere d domain name	*Total*	*Percent*
Agriculture/ Forestry/Fishing	A	0	0	2	2	2	2	2	0	4	1	3	4	4	7	6	6	7	8	7		
	B (%)	0	0	7	5	5	5	4	0	7	1	4	4	4	6	5	5	5	6	5	*8*	*5*
	C(%)	0	0	25	25	25	25	25	0	50	13	38	50	50	88	75	75	88	100	88		
Construction	A	1	3	2	3	3	1	1	2	2	2	3	4	4	6	4	3	5	5	5		
	B (%)	6	18	7	8	7	2	2	4	4	3	4	4	4	5	3	2	4	4	4	*7*	*5*
	C(%)	14	43	29	43	43	14	14	29	29	29	43	57	57	86	57	43	71	71	71		
Electronics/ Computers Communications	A	0	1	2	4	4	3	1	4	4	6	8	10	7	11	11	12	13	14	13		
	B (%)	0	6	7	11	10	7	2	8	7	9	10	11	7	10	9	10	10	10	9	*16*	*11*
	C(%)	0	6.25	12.5	25	25	18.75	6.25	25	25	37.5	50	62.5	43.75	68.75	68.75	75	81.25	87.5	81.25		
Financial Services	A	0	1	7	5	6	5	6	9	6	9	12	17	19	21	24	26	28	31	29		
	B (%)	0	6	25	14	15	11	13	18	11	13	15	19	20	18	21	21	22	23	21	*32*	*21*
	C(%)	0	3	22	16	19	16	19	28	19	28	38	53	59	66	75	81	88	97	91		
Manufacturing (non electronics)	A	10	6	6	10	13	12	15	21	21	22	20	23	30	29	32	34	34	32	37		
	B (%)	59	35	21	27	32	27	31	41	37	32	26	26	31	25	27	28	26	24	27	*38*	*25*
	C(%)	26	16	16	26	34	32	39	55	55	58	53	61	79	76	84	89	89	84	97		
Media/Marketing/ Consulting	A	3	4	2	4	3	5	5	3	3	5	7	6	6	7	7	7	8	9	8		
	B (%)	18	24	7	11	7	11	10	6	5	7	9	7	6	6	6	6	6	7	6	*10*	*7*
	C(%)	30	40	20	40	30	50	50	30	30	50	70	60	60	70	70	70	80	90	80		
Mining	A	1	0	2	2	1	5	5	2	5	7	7	8	6	8	7	8	10	10	10		
	B (%)	6	0	7	5	2	11	10	4	9	10	9	9	6	7	6	7	8	7	7	*10*	*7*
	C(%)	10	0	20	20	10	50	50	20	50	70	70	80	60	80	70	80	100	100	100		
Retail	A	1	1	2	1	2	2	1	2	2	4	6	4	5	7	6	6	6	6	7		
	B (%)	6	6	7	3	5	5	2	4	4	6	8	4	5	6	5	5	5	4	5	*7*	*5*
	C(%)	14	14	29	14	29	29	14	29	29	57	86	57	71	100	86	86	86	86	100		
Transportation	A	1	0	2	3	5	3	5	3	5	5	3	6	6	6	7	7	7	7	7		
	B (%)	6	0	7	8	12	7	10	6	9	7	4	7	6	5	6	6	5	5	5	*7*	*5*
	C(%)	14	0	29	43	71	43	71	43	71	71	43	86	86	86	100	100	100	100	100		
Tourism	A	0	0	1	1	0	1	2	0	1	1	1	0	1	3	3	3	3	3	3		
	B (%)	0	0	4	3	0	2	4	0	2	1	1	0	1	3	3	2	2	2	2	*3*	*2*
	C(%)	0	0	33	33	0	33	67	0	33	33	33	0	33	100	100	100	100	100	100		
Wholesale	A	0	0	0	1	1	3	2	3	1	3	4	3	3	5	5	6	5	6	6		
	B (%)	0	0	0	3	2	7	4	6	2	4	5	3	3	4	4	5	4	4	4	*6*	*4*
	C(%)	0	0	0	17	17	50	33	50	17	50	67	50	50	83	83	100	83	100	100		
Others	A	0	1	0	1	1	2	3	2	3	3	4	5	5	4	5	3	3	5	6		
	B (%)	0	6	0	3	3	5	6	4	5	4	5	6	5	4	4	2	2	4	4	*6*	*4*
	C(%)	0	17	0	17	17	33	50	33	50	50	67	83	83	67	83	50	50	83	100		
Total	*No of Respondents*	*17*	*17*	*28*	*17*	*41*	*44*	*48*	*51*	*57*	*68*	*78*	*99*	*96*	*114*	*117*	*121*	*129*	*136*	*138*	150	*100*
	%tage	*11*	*11*	*19*	*25*	*27*	*29*	*32*	*34*	*38*	*45*	*52*	*60*	*64*	*76*	*78*	*81*	*86*	*91*	*92*	*100*	

A: Number of Respondents
B: Shows the percentage distribution of the implemented technologies within each sector-no. of respondents to row totals
C: Shows the percentage distribution of the implemention of a given technology across sectors- no. of respondents to column totals

Table 7A.2 Distribution of Currently Implemented eCommerce Technologies by Busines Size

eCommerce Technologies		Small			Medium			Small and Medium			Large			Total	
		A	B	C	A	B	C	A	B	C	A	B	C	*No of respondents*	*Percentage*
Supplier Relationship Management (SRM)		1	4	6	0	0	0	1	2	6	16	17	94	***17***	***11***
Partners Relationship Management (PRM)		3	13	18	1	3	6	4	7	24	13	14	76	***17***	***11***
Digital signatures		5	22	18	5	16	18	10	19	36	18	19	64	***28***	***19***
Customer Relationship Management (CRM)		6	26	16	7	23	19	13	24	35	24	25	65	***37***	***25***
Secured Electronic Transaction		6	26	15	6	19	15	12	22	29	29	31	71	***41***	***27***
Customers payment by credit card		4	17	9	7	23	16	11	20	25	33	35	75	***44***	***29***
Enterprise Resource Planning		3	13	6	4	13	8	7	13	15	41	43	85	***48***	***32***
Extranet		3	13	6	10	32	20	13	24	26	37	39	74	***50***	***33***
Call Center		7	30	13	8	26	14	15	28	27	41	43	73	***56***	***37***
Electronic document interchange		6	26	9	9	29	13	15	28	22	52	55	78	***67***	***45***
Non Internet based e-mail		10	43	13	12	39	15	22	41	28	56	59	72	***78***	***52***
Dial up internet access		12	52	13	18	58	20	30	56	33	60	63	67	***90***	***60***
Intranet		10	43	11	19	61	20	29	54	31	66	69	69	***95***	***63***
Electronic Funds Transfer (EFT)		18	78	16	22	71	19	40	74	35	74	78	65	***114***	***76***
Firewalls		14	61	12	26	84	22	40	74	34	76	80	66	***116***	***77***
Dedicated line Internet access		15	65	13	25	81	21	40	74	33	80	84	67	***120***	***80***
Website		17	74	13	28	90	22	45	83	35	83	87	65	***128***	***85***
Local Area Network		19	83	14	30	97	22	49	91	36	86	91	64	***135***	***90***
Registered domain name		17	74	12	29	94	21	46	85	34	91	96	66	***137***	***91***
Total	***No.***		***23***			***31***			***54***			***95***		***149***	
	Percentage		***15***			***21***			***36***			***64***			***100***

A: No of respondents
B: Shows the percentage distribution of the implemention of the technologies within each size categorv- no of respondents to column total
C: Shows the percentage of businesses that implemented the given technology -no of respondents to the row total

APPENDIX 7B: Business Functions Performed Electronically

Appendix 7B Business Functions Performed Electronically

Table 7B.2 Distribution of Business Functions Performed Electronically by Size

Business Functions	Small and Medium			Large			Total	Percentage
	No of Respondents	%tage to row total	%tage to total number of SMEs (54)	No of Respondents	%tage to row total	%tage to total number of large businesses (95)		
Publishing Company Info	44	35	81	83	65	87	*127*	*85*
Consumer Communication	32	37	59	54	63	57	*86*	*57*
Communicating With Partners	32	38	59	53	62	56	*85*	*57*
Internal communication	41	35	76	77	65	81	*118*	*79*
Product development	10	29	19	25	71	26	*35*	*23*
Market research	18	35	33	34	65	36	*52*	*35*
Competitive intelligence	9	20	17	35	80	37	*44*	*29*
Advertising	24	32	44	52	68	55	*76*	*51*
Selling products and services	17	35	31	32	65	34	*49*	*33*
Receiving customer orders	10	27	19	27	73	28	*37*	*25*
Providing customer service	18	35	33	33	65	35	*51*	*34*
Receiving Customer payment	10	30	19	23	70	24	*33*	*22*
Placing orders with suppliers	11	28	20	28	72	29	*39*	*26*
Making payments to suppliers	14	34	26	27	66	28	*41*	*27*
Human resources	8	28	15	21	72	22	*29*	*19*
Telecommuting	9	20	17	36	80	38	*45*	*30*
Total	***54***		***100***	***95***		***100***	***149***	

Table 7B. 1 Sectoral Distribustion of Business Functions Performed Electronically

Sector		Publishing Company Info	Consumer Communication	Communicating With Partners	Internal communication	Product development	Market research	Competitive intelligence	Advertising	Selling products and services	Receiving customer orders	Providing customer service	Receiving Customer payment	Placing orders with suppliers	Making payments to suppliers	Human resources	Telecommuting	Total
	A	3	3	5	7	1	1	1	2	1	1	0	2	0	2	1	2	6
Agriculture	B (%)	4	3	6	6	0	4	2	3	2	3	0	6	0	5	3	4	
	C (%)	67	50	83	100	17	67	33	50	33	50	0	100	0	83	50	67	
	A	6	5	5	6	2	4	3	5	2	2	3	0	0	1	3	4	7
Construction	B (%)	5	6	6	5	6	8	7	7	4	5	6	0	0	2	10	9	
	C (%)	86	71	71	86	29	57	43	71	29	71	86	0	0	29	143	129	
	A	14	10	9	13	4	7	7	8	3	3	6	2	5	4	4	1	16
Electronics	B (%)	13	12	11	11	17	13	16	11	6	8	12	6	11	10	14	7	
	C (%)	88	63	56	81	25	44	44	50	19	19	38	13	31	25	25	13	
	A	28	25	24	28	9	17	14	18	20	15	19	8	12	10	6	14	32
Financial	B (%)	22	29	28	24	26	33	32	24	41	41	37	24	31	24	21	31	
	C (%)	88	100	96	96	36	68	56	72	80	60	76	32	48	40	24	56	
	A	34	21	15	29	7	11	12	23	8	5	7	9	11	9	4	9	38
Manufacturing	B (%)	27	24	18	25	20	21	27	30	16	14	14	27	28	22	14	20	
	C (%)	89	55	39	66	16	29	32	61	21	13	18	34	29	24	11	24	
	A	8	5	8	7	0	3	0	4	2	2	3	2	1	4	3	2	10
Media	B (%)	6	6	9	7	0	6	0	5	4	5	6	6	8	10	10	4	
	C (%)	80	50	90	80	0	30	0	40	20	20	30	20	30	40	30	20	
	A	10	4	7	9	3	2	1	3	4	2	3	3	4	5	1	4	10
Mining	B (%)	8	5	8	8	9	4	2	4	8	5	6	6	10	12	7	9	
	C (%)	100	40	70	80	30	20	10	30	40	20	30	30	40	50	20	40	
	A	6	2	2	5	1	2	2	4	1	1	2	3	2	2	2	1	7
Retail	B (%)	5	2	2	4	3	1	5	5	2	3	4	9	5	5	7	2	
	C (%)	86	29	29	71	14	29	71	71	29	43	57	129	71	71	100	29	
	A	5	4	4	5	2	1	2	3	3	4	3	2	1	1	0	2	7
Transportation	B (%)	4	5	3	4	6	2	5	4	7	11	6	6	3	2	0	4	
	C (%)	71	57	57	71	29	14	29	57	43	57	43	29	14	14	0	29	
	A	3	2	1	2	3	1	0	3	2	1	2	2	0	0	2	1	3
Tourism	B (%)	2	2	1	2	6	2	0	4	4	3	4	6	0	0	7	2	
	C (%)	100	67	33	67	67	33	0	100	33	67	67	67	0	0	67	33	
	A	3	2	2	3	2	2	2	2	2	1	1	1	0	1	1	1	6
Wholesale	B (%)	2	2	2	3	6	4	5	3	4	3	2	3	0	2	3	2	
	C (%)	50	33	33	50	33	33	33	33	33	33	33	33	0	33	50	33	
	A	5	3	3	3	1	0	0	1	1	0	2	0	1	2	1	2	6
Other	B (%)	4	3	4	3	3	0	0	1	2	0	4	0	3	5	3	1	
	C (%)	83	50	67	50	17	0	0	17	17	0	33	0	17	33	17	33	
Total No. of respondents for this function		*127*	*86*	*85*	*118*	*33*	*53*	*44*	*76*	*60*	*47*	*53*	*33*	*35*	*41*	*30*	*60*	*550*
Percent of respondents		*85*	*57*	*57*	*79*	*22*	*35*	*29*	*51*	*40*	*31*	*35*	*22*	*23*	*27*	*20*	*40*	

A: No of Respondents
B: Represents the percentage distribution of electronically performed functions within each sector-no. of respondents to column totals
C: Represents the percentage distribution of electronic performance of a particular function across sectors- no. of respondents to row totals

APPENDIX 7C: Current eCommerce Status of Businesses

Appendix 7C Current eCommerce Status of Respondents

Table 7C. 1 eCommerce Status

	1999		2001		2003	
	No of Respondents	Percentage	No of Respondents	Percentage	No of Respondents	Percentage
None	10	7	0	0	0	0
Connected	50	33	14	9	6	4
Presence	52	35	43	29	12	8
Interactive	32	21	61	41	38	25
Transactive	5	3	26	17	39	26
Integrated	1	1	6	4	55	37
	150	100	150	100	150	100

Table 7C.2 Current (2001) eCommerce Status of Respondents by Sector

Sector	Connected		Presence		Interactive		Transactive		Integradted		Total
	No of Respondent	Sector % tage	No of Respondent	Sector % tage	No of Respondent	Sector % tage	No of Respondent	Sector % tage	No of Respondent	Sector % tage	
Agriculture/Forestry/Fishing	2	25	3	38	3	38	0	0	0	0	8
Construction	0	0	2	29	5	71	0	0	0	0	7
Electronics/Computers Communications	0	0	3	19	9	56	4	25	0	0	16
Financial Services	1	3	8	25	9	28	12	38	2	6	32
Manufacturing (non electronics)	3	8	15	39	17	45	2	5	1	3	38
Media/Marketing/Consulting	2	20	1	10	7	70	0	0	0	0	10
Mining	0	0	4	40	3	30	3	30	0	0	10
Retail	1	14	3	43	1	14	2	29	0	0	7
Transportation	2	29	0	0	2	29	1	14	2	29	7
Tourism	0	0	0	0	2	67	1	33	0	0	3
Wholesale	3	60	1	20	0	0	1	20	0	0	5
Others	0	0	3	50	3	50	0	0	0	0	6
Total	14	9	43	29	61	41	26	17	5	3	149

Table 7C.3 Current (2001) eCommerce Status of Respondents by Size

eCommerce Status	Small		Medium		Small and Medium		Large		Total
	Number of Respondent	% tage within size	Number of Respondent	% tage within size	Number of Respondent	% tage within size	Number of Respondent	% tage within size	
Connected	3	13	3	10	6	11	9	9	15
Presence	7	30	8	26	15	28	28	29	43
Interactive	10	43	15	48	25	46	35	37	60
Transactive	3	13	5	16	8	15	18	19	26
Integrated	0	0	0	0	0	0	5	5	5
Total	23		31		54		95	0	149

APPENDIX 7D: Future eCommerce Implementation Plans

Appendix 7D Future Plans for the Implementaion of eCommerce Thechnologies and Electronically Performed Business Functions by Business Size

Table 7D.1 New eCommerce Technologies to be Implemented in the Next two Years

eCommerce Technologies	Small		Medium		Small and Medium		Large		Total	
	No. of Respondents	%tage to total no. of small businesses	No. of Respondents	%tage to total no. of medium businesses	No. of Respondents	%tage to total no. of SMEs	No. of Respondents	%tage to total no. of large businesses	No. of Respondents	%tage to total no. of respondnets
Dial up internet access	0	0	0	0	0	0	0	0	0	0
local Area Network	1	4	0	0	1	2	4	4	5	3
Registered domain name	2	9	1	3	3	6	2	2	5	3
Non Internet based e-mail	1	4	2	6	3	6	4	4	7	5
Dedicated line internet access	2	9	4	13	6	11	7	7	13	9
Website	3	13	2	6	5	9	9	9	14	9
Firewalls	2	9	2	6	4	7	13	14	17	11
Electronic Funds Transfer	3	13	4	13	7	13	14	15	21	14
Customers payment by credit card	7	30	3	10	10	19	19	20	29	19
Intranet	5	22	8	26	13	24	16	17	29	19
Call Center	4	17	6	19	10	19	20	21	30	20
Enterprise Resource Planning	8	35	5	16	13	24	26	27	39	26
Electronic document interchange	6	26	10	32	16	30	24	25	40	27
Extranet	6	26	8	26	14	26	27	28	41	28
Partners Relationship Management	7	30	7	23	14	26	31	33	45	30
Supplier Relationship Management	7	30	10	32	17	31	37	39	54	36
Digital signatures	8	35	8	26	16	30	42	44	58	39
Customer Relationship Management	8	35	13	42	21	39	38	40	59	40
Secured Electronic Transaction	10	43	8	26	18	33	42	44	60	40
Total	23	100	31	100	54	100	95	100	149	100

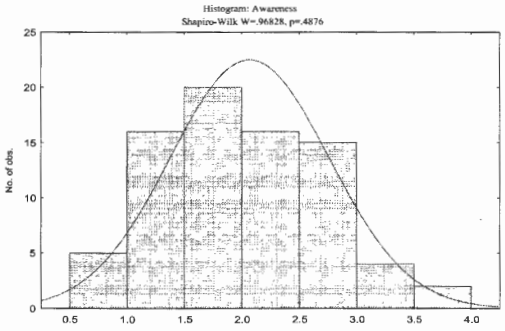
Table 7D. 2 Business Functions to be Performed Elctronically in the Next Two Years by Business Size

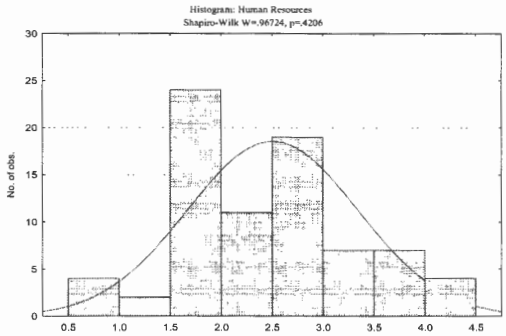
Business Functions	Small		Medium		Small and Medium		Large		Total	
	No. of Respondents	%tage to total no. of small businesses	No. of Respondents	%tage to total no. of medium businesses	No. of Respondents	%tage to total no. of SMEs	No. of Respondents	%tage to total no. of large businesses	No. of Respondents	%tage to total no. of respondnets
Internal communication	4	17	4	13	8	15	10	11	18	12
Advertising	6	26	9	29	15	28	22	23	37	25
Communicating With Partners	6	26	9	29	15	28	23	24	38	26
Telecommuting	7	30	10	32	17	31	21	22	38	26
Product development	6	26	8	26	14	26	25	26	39	26
Competitive intelligence	10	43	8	26	18	33	27	28	45	30
Consumer Communication	5	22	8	26	13	24	33	35	46	31
Market research	9	39	5	16	14	26	32	34	46	31
Human resources	7	30	8	26	15	28	41	43	56	38
Selling products and services	10	43	10	32	20	37	42	44	62	42
Providing customer service	9	39	11	35	20	37	44	46	64	43
Making payments to suppliers	8	35	14	45	22	41	47	49	69	46
Receiving customer orders	10	43	12	39	22	41	48	51	70	47
Receiving Customer payment	11	48	14	45	25	46	45	47	70	47
Placing orders with suppliers	11	48	13	42	24	44	53	56	77	52
Total	23	100	31	100	54	100	95	100	149	100

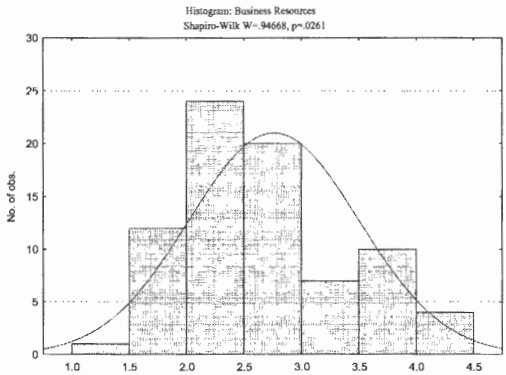
APPENDIX EIGHT

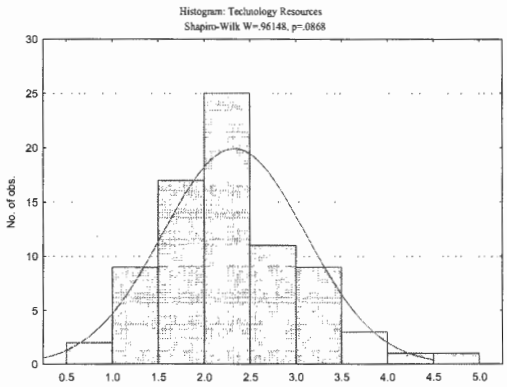
Hypothesis Testing Additional Statistics

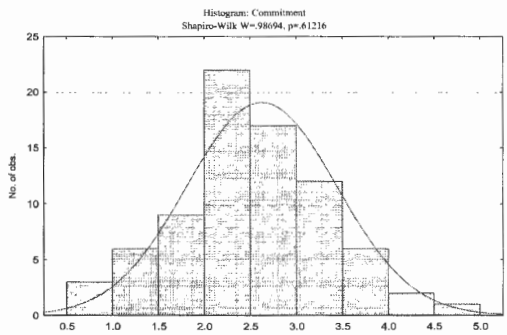
APPENDIX 8A: Normality Histogram

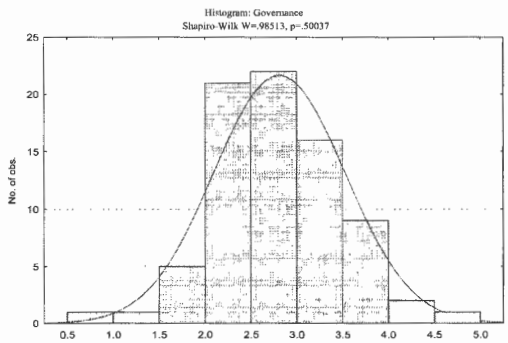


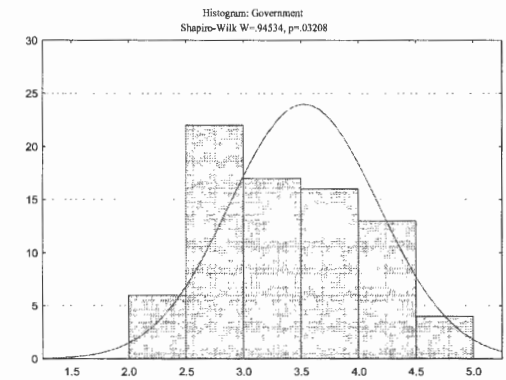


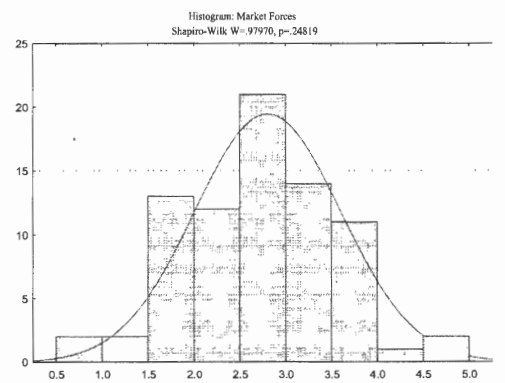


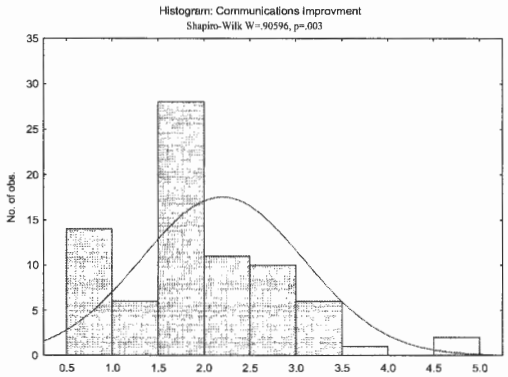











Histogram: Communications Improvment
Shapiro-Wilk W=.90596, p=.003
No. of obs.
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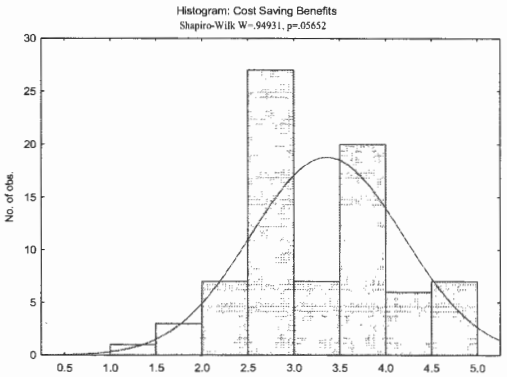
Histogram: Cost Saving Benefits
Shapiro-Wilk W=.94931, p=.05652
No. of obs.
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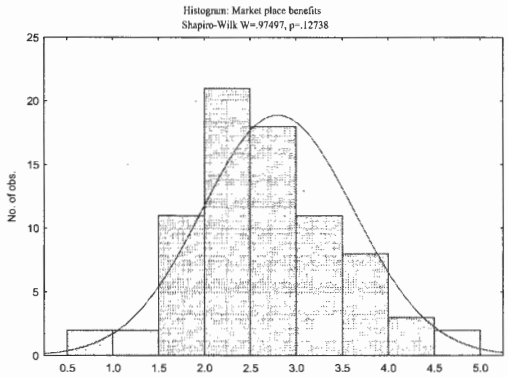
Histogram: Market place benefits
Shapiro-Wilk W=.97497, p=.12738
No. of obs.
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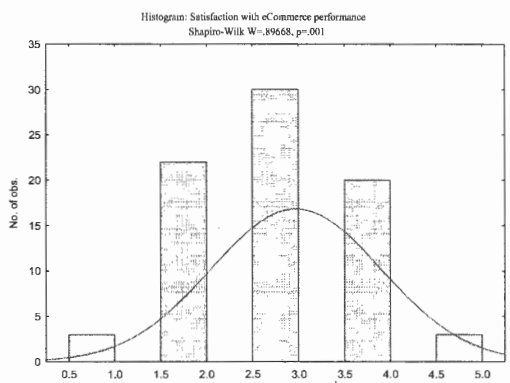
Histogram: Satisfaction with eCommerce performance
Shapiro-Wilk W=.89668, p=.001
No. of obs.
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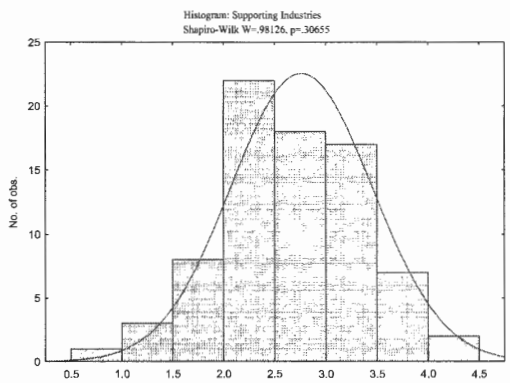
Histogram: Supporting Industries
Shapiro-Wilk W=.98126, p=.30655
No. of obs.
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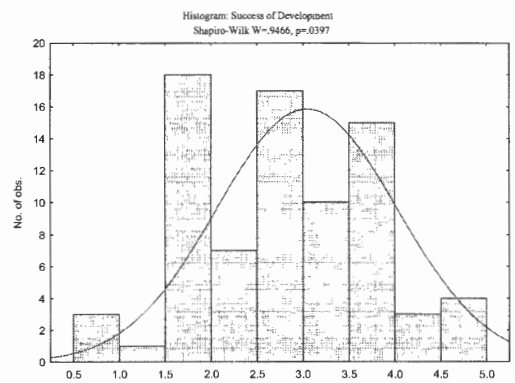
Histogram: Success of Development
Shapiro-Wilk W=.9466, p=.0397
No. of obs.
0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0

APPENDIX 8B: Mean Scores of the eReadiness and eCommerce Success Profiles

8B.1 Organizational eReadiness Mean Scores

	Awareness	Human Resources	Business Resources	Technology Resources	Commitment	Governance
Connected	2.71	3.43	3.14	2.77	2.55	2.81
Presence	2.49	2.50	3.04	2.61	2.78	2.81
Interactive	2.22	2.39	2.74	2.32	2.53	2.78
Transactive	1.76	2.12	2.54	2.13	2.31	2.57
Integrated	1.77	2.30	2.53	1.76	2.00	2.53
All Groups	2.26	2.46	2.82	2.39	2.55	2.81

8B. 2 External eReadiness Mean Scores

	Market Forces eR	Governmant eR	Support Industries eR
Connected	3.32	3.54	2.63
Presence	3.34	3.53	2.88
Interactive	3.29	3.39	2.80
Transactive	2.96	3.62	2.98
Integrated	1.90	3.70	2.35
All Grps	3.20	3.50	2.81

8B.3 eCommerce Success Mean Scores

	Development	Communication Improvement	Market Place benefits	Cost Saving benefit	Satisfaction with eC performance
Connected	3.03	2.19	2.82	3.32	2.94
Presence	3.03	2.19	2.82	3.32	2.94
Interactive	2.92	2.14	2.85	3.38	2.91
Transactive	2.95	2.22	2.69	3.16	2.95
Integrated	2.60	1.90	2.20	2.60	2.40
All Grps	3.04	2.20	2.80	3.32	2.94

8B.4 eReadiness Profile Mean Score by Size

	SME	Large	All Grps
Awareness	2.29	2.24	2.26
Human Resources	2.02	2.72	2.46
Business Resources	2.55	2.97	2.82
Technology Resources	2.57	2.32	2.39
Commitment	2.46	2.60	2.55
Governance	2.82	2.80	2.81
Government eReadiness	3.55	3.47	3.50
Market Forces. eReadiness	3.23	3.17	3.20
Support Indust. eReadiness	2.78	2.81	2.81

8B.5 eCommerce Success Profile Means Score by Size

	SME	Large	All Groups
Development	2.63	3.20	3.04
Communication Improvement	2.00	2.27	2.20
Market place benefits	2.57	2.89	2.80
Cost Saving benefits	3.26	3.38	3.34
Satisfaction with eC performance	3.04	2.92	2.95

8B. 6 eReadiness Profile Mean Score by Sector

	Awareness	Human Reso.	Business Reso.	Technology Reso.	Commitment	Governance	Market Forces eR	Government eR	Supporting Industries eR
Agriculture	2.78	3.50	3.15	2.91	2.71	2.80	3.56	3.36	2.81
Construction	2.00	1.86	2.86	2.54	2.76	2.96	2.86	3.54	2.79
Electronics	2.16	1.75	2.66	2.18	2.63	2.83	3.41	3.69	3.30
Financial	2.04	1.81	2.68	2.28	2.38	2.78	3.03	3.60	2.77
Manufacturing	2.33	2.92	2.86	2.36	2.52	2.78	3.42	3.51	2.83
Media	2.49	2.00	2.59	2.62	2.43	2.73	2.88	3.17	2.44
Mining	2.10	2.95	2.73	2.33	2.54	2.77	3.00	3.30	3.00
Retail	2.69	3.14	2.99	2.91	2.74	2.75	3.21	3.32	2.68
Transportation	2.04	3.14	3.14	2.20	2.93	3.05	2.57	3.61	2.57
Tourism	1.90	2.17	2.44	1.67	2.25	2.82	3.00	3.33	3.08
Wholesale	2.40	2.64	3.40	2.83	2.65	2.90	3.71	3.79	2.46
All Group	2.26	2.46	2.82	2.39	2.55	2.81	3.20	3.50	2.81

8B. 7 eCommerce Success Profile Mean Score by Sector

	Success of Development	Communication Improvement	Market place benefits	Cost saving benefits	Satisfaction with EC performance
Agriculture	2.91	2.35	2.52	3.14	2.85
Construction	3.29	2.20	3.23	3.47	2.98
Electronics	2.86	2.24	2.67	3.30	2.91
Financial	2.90	2.12	2.80	3.39	3.15
Manufacturing	3.10	2.21	2.80	3.40	2.94
Media	2.94	2.12	3.00	3.22	2.96
Mining	3.11	2.03	3.08	3.09	2.18
Retail	3.09	2.47	2.57	3.23	2.97
Transportation	3.44	2.34	2.59	3.23	3.41
Tourism	3.17	2.00	3.00	3.44	2.67
Wholesale	3.02	2.14	2.90	3.28	2.82
All Group	3.03	2.19	2.82	3.32	2.94

APPENDIX 8C Additional Statistics for eCommerce Adoption

8C.1. Correlation Matrix for Initial eCommerce Adoption

Variable	Correlations (reducedFinal) Marked correlations (BUI) are significant at p < .001						
	1	2	3	4	5	6	7
1.Awareness	1.00						
2. Human Res.		1.00					
3. Business Res.			1.00				
4. Technology Res.				1.00			
5. Commitment					1.00		
6. Market Fo. Er.						1.00	
7. Government er.	0.01	0.10	0.08	0.10	0.13		1.00
8. Support Ind. er.	0.06	0.08	0.14	0.07	0.17		
9. Adoption					0.14		-0.13

8C.2 MDFA Summary for initial eCommerce Adoption

N=150	Discriminant Function Analysis Summary (reducedFinal) No. of vars in model: 8; Grouping: INITadopt (2 grps) Wilks' Lambda: .25518 approx. F (8,141)=51.443 p<0.0000				
	Wilks' Lambda	Partial Lambda	F-remove (1,141)	p-level	Toler.
AWAV	0.255	0.860	15.95	0.000	0.832
HRAV	0.577	0.442	177.8	0.000	0.971
BRAV	0.269	0.549	67.31	0.000	0.929
TRAV	0.267	0.954	6.8	0.010	0.866
COAV	0.255	0.999	0.2	0.692	0.861
MFAV	0.267	0.955	6.6	0.011	0.804
GOAV	0.256	0.997	0.4	0.523	0.832
SIAV	0.255	0.999	0.1	0.756	0.788

8C.3 Correlation Matrix for eCommerce Institutionalization (Adopters only)

Variable	Correlations (reducedFinal) Marked correlations are significant at p < .05000								
	AWAV	HRAV	BRAV	TRAV	COAV	GVAV	MFAV	GOAV	SIAV
AWAV	1.00								
HRAV	-0.01	1.00							
BRAV	0.28	0.10	1.00						
TRAV	0.24	-0.04	0.27	1.00					
COAV	0.46	-0.02	0.40	0.29	1.00				
GVAV	0.38	0.06	0.44	0.35	0.65	1.00			
MFAV	0.34	-0.12	0.13	0.14	0.34	0.17	1.00		
GOAV	-0.01	-0.03	0.02	0.12	0.01	-0.02	0.13	1.00	
SIAV	-0.02	-0.08	0.09	0.03	0.05	-0.14	0.31	0.39	1.00
Maturity	0.56	-0.13	0.30	0.25	0.61	0.42	0.36	0.31	0.28

8C.4 MDFA Summary for eCommerce Institutionalization (Adopters Only)

N=92	Discriminant Function Analysis Summary (reducedFinal) Step 9, N of vars in model: 9; Grouping: Maturity (3 grps) Wilks' Lambda: .11140 approx. F (18,154)=17.078 p<0.0000				
	Wilks' Lambda	Partial Lambda	F-remove (2,77)	p-level	Toler.
MFAV	0.2465	0.4520	46.673	0.0000	0.9359
GOAV	0.1475	0.7552	12.479	0.0000	0.8969
GVAV	0.1346	0.8279	8.002	0.0007	0.9474
SIAV	0.1393	0.7998	9.635	0.0002	0.8783
COAV	0.1311	0.8495	6.820	0.0019	0.5971
HRAV	0.1182	0.9422	2.362	0.1010	0.9378
TRAV	0.1153	0.9666	1.330	0.2705	0.9067
BRAV	0.1151	0.9680	1.274	0.2857	0.8443
AWAV	0.1132	0.9838	0.633	0.5339	0.5939