UNIVERSITY OF SOUTHERN QUEENSLAND

A study of the nature and extent of Atlantic Canadian small and medium business e-commerce usage leading to the development and testing of a model to explain future adoption intentions

A Dissertation submitted by

Peter Mombourquette, BA, BEd, MBA

For the award of

Doctor of Business Administration

2008

ABSTRACT

This research examines the nature and extent of e-commerce use among Atlantic Canadian small and medium enterprises (SMEs), develops a model to explain future intentions to adopt more sophisticated e-commerce technologies and tests the model to determine if it explains current levels of e-commerce adoption.

A literature review evaluates previous research work in adoption of innovations, adoption of Information Technology (IT), e-commerce adoption, e-commerce adoption and use among Canadian and Atlantic Canadian SMEs, and on the characteristics of the Atlantic Canadian region. It was found that there were gaps in literature about factors that explain SMEs intentions to adopt more sophisticated e-commerce and their current level of e-commerce adoption. Furthermore it was discovered that almost no research existed on the nature and extent of e-commerce use among Atlantic Canada SMEs. A preliminary model was developed to examine both intentions to adopt more sophisticated technologies and current adoption levels.

Case study and survey research were adopted for this dissertation. Five case study interviews were used to reconfirm the preliminary model and to gain insight into the nature and extent of e-commerce use. A pre-test of the survey instrument with 31 respondents was then used to further reconfirm the research mode and to gather additional information on the current use of e-commerce. A telephone survey with 289 respondents statistically tested the model that posited that SME's current and future use of e-commerce can be explained by the decision makers' perception of performance and effort expectancy, social influence, top management/CEO innovativeness and IT knowledge, employee IT knowledge and business size. The survey also examined the nature and extent of e-commerce usage among Atlantic Canadian SMEs.

Significant findings from this research are, first, Atlantic Canadian SMEs are adopting basic e-commerce technologies but are not adopting or planning to adopt sophisticated technologies. This is in spite of evidence that suggests that SMEs that adopt e-commerce are likely to experience significant benefits. Second, decision makers in SMEs do not understand the general benefits of adopting e-commerce technology or furthering the extent of their adoption. Third, decision makers in SMEs appear to lack understanding about specific benefits of e-commerce use, are not convinced in their ability to use new e-commerce technologies and do not identify people in their peer group that will positively impact their decision to adopt. In addition while owners/CEOs appear to feel that they are somewhat innovative, have some degree of computer knowledge and that their staff also has some knowledge they are not over certain in their own or their staff's knowledge and skills. Fourthly, the model did explain a significant amount of SMEs' intentions to adopt additionally technology with performance expectancy, effort expectance and social influence being the most significant constructs. The model did not assist in understanding current usage of e-commerce among Atlantic Canadian SMEs.

CERTIFICATION OF DISSERTATION

I certify that the ideas, experimental work, results, analyses, software and conclusions reported in this dissertation are entirely my own effort, except where otherwise acknowledged. I also certify that the work is original and has not been previously submitted for any other award, except where otherwise acknowledged.

_____ _____

Signature of Candidate Date

ENDORSEMENT

_____ _____

Signature of Supervisor Date

_____ _____

Signature of Supervisor Date

ACKNOWLEDGEMENTS

A number of people should be acknowledged for their contributions to the fulfillment of this dissertation. I am in particularly indebted to my wife, Amanda, for her strong support and encouragement during the research and writing phases. I suffered a back injury and a serious stomach ailment during the writing of this paper and without her encouragement I would have never finished. Equally important to this process was my son, Jack, whose mere presence motivated me to continue working even though I was often forced to do so while being bed ridden. Without the two of them I would have never completed this work.

I also have to thank Dr Mark Toleman for his advice, assistance, support and patience through this process. I feel truly fortunate that Mark served as my supervisor as he is an excellent professor and person. I am also indebted to Dr Aileen Cater-Steel for her advice and support in finalizing my dissertation. Additionally I should thank Dr Ronel Erwee who, in her administration position, allowed me the extra time needed to complete this dissertation.

Special thanks also go to all of my colleagues at Mount Saint Vincent University who provided encouragement, advice and support through this process. I am fortunate to work in such a wonderful atmosphere.

Finally I would like to thank my parents for encouraging me to finish this dissertation in their own unique way.

TABLE OF CONTENTS

List of Appendices

List of Figures

List of Tables

CHAPTER 1: INTRODUCTION

1.1 Introduction

This chapter outlines the foundation for this dissertation beginning with an overview of information on the background of e-commerce, the importance and use of e-commerce and SMEs in Canada, and then reviews these factors as they pertain to firms in the Atlantic Canada region. The chapter then explains the major research problem, briefly discusses how the problem will be solved, including the justification for the research, and examines the research methodology. The full dissertation is then summarized, key definitions are examined, areas of future research and delimitations are discussed, and a summary provides a review of the main topics covered.

1.2 Background

The use of the Internet and e-commerce has radically changed the way business is conducted (Fast Forward 5.0 2004; McClean, Johnston & Wade 2002). E-commerce technologies have led to improved communications (Johnston, McClean & Wade 2004; Wu, Mahajan & Balasubramanian 2003), increased revenue (Beck, Wigand and König 2005) and decreased costs (Johnston, Wade & McClean 2007) in large and small businesses alike. Small and medium businesses (SMEs) have the most potential to benefit from the use of e-commerce as the technology will allow them to compete with larger businesses, expand the geographic scope of their sales and decrease costs (Fast Forward 5.0 2004; Johnston, McClean & Wade 2004). Unfortunately, research has indicated that SMEs are less likely to adopt e-commerce technologies than larger businesses, do so in small increments, and often only adopt basic technologies, avoiding more sophisticated and beneficial e-commerce solutions (Fomin et al. 2005; Levenburg & Magal 2005; MacGregor & Vrazalic 2004). Furthermore, many SMEs have no intention to adopt e-commerce; (CeBI 2003; Goode 2002), the majority of early adopters are failing to increase their adoption of technology (Houghton & Winklhofer 2004; CeBI 2003), and SMEs' reluctance to adopt sophisticated technologies is reducing the effectiveness of their Internet use and is likely costing them opportunities (Beck, Wigand & König 2005). In brief, e-commerce is changing the way business is conducted; SMEs are likely have the most to gain by adopting the technology but they have been slow to do so; and many businesses will not realize the full benefits of adopting e-commerce because they are only adopting basic technologies.

The adoption of e-commerce, particularly sophisticated e-commerce is noted in various research articles as being important to SMEs. Yet Premkumar (2003), in a literature review, noted there is a lack of research on SMEs adoption decisions. Furthermore, the research to date has been described as contradictory (Premkumar 2003) offering few comparison studies and a lack of clearly defined variables or terms (Wymer & Regan 2005). Researchers in the field either postulate that certain drivers or facilitators encourage e-commerce use, as seen in work completed by Levenburg, Magal and Kosalge (2006), or adopt a behavior intentions model from social psychology that has been previously applied to Information Technology (IT) adoption decisions. Authors often add or remove constructs (facilitators) to try to

gain an understanding of adoption decisions but rarely discuss why they have done this or present competing models (Venkatesh et al. 2003; Taylor & Todd 1995a, 1995b). The research to date is also problematic as most studies do not occur at the time of the actual adoption but retrospectively. Taylor and Todd (1995a, 1995b) note that retrospective research has the potential to lead to inaccurate results. Thus there is a need to develop a unified or singular model that encompasses previous research to account for e-commerce adoption intentions. Furthermore, the model should be tested on SMEs at the time decisions are occurring.

Such research would be particularly important to the Canadian economy as the majority of businesses are classified as SMEs. In fact in Canada, 97% of firms have fewer than 20 employees and the majority of this group has no employees (Bourgeois 2006a, 2006b, 2006c, 2006d). SMEs in Canada account for the majority of jobs, job growth and innovation (Bourgeois 2006a; ACOA 2005). The Canadian government has noted that e-commerce adoption by SMEs is crucial to maintaining a strong economy and created the Electronic Commerce Branch of Industry Canada, and the Canadian e-Business Initiative (CeBI) to actively study and encourage e-commerce adoption by SMEs (Fast Forward 5.0 2004; Johnston, McClean & Wade 2004). While initially e-commerce growth was described as promising in 2000 – 2001 (McClean, Johnston & Wade 2003), further research by both groups determined that growth was not to be realized and changed their description of e-commerce in 2003 (Noce & Peters 2005; Fast Forward 5.0 2004; Johnston, McClean & Wade 2004). The adoption of e-commerce in Canada may actually be worse than the groups concluded as neither party studied businesses that were very small. Those with less than 20 employees were excluded (CeBI) or $250,000 in revenue (Industry Canada). Therefore the development and application of an e-commerce adoption model would be particularly useful to the Canadian economy. The research to date also leads to the questions: do we actually know the percentage of small SMEs in Canada that use e-commerce and what technologies are they using?

Of all the regions in Canada, the Atlantic Canadian region has the greatest potential to be impacted by SME e-commerce use. The region is considered to be very different compared to the rest of the country from cultural, business, economical and social standards (ShiftCentral 2003; Wallace 2002). The population is small and more rural compared to the rest of Canada. Historically the economy is and has been poorer (1920s to present day) than the rest of the country (ACOA 2005; ShiftCentral 2003; Desjardins, Hobson & Savoie 2000) and is dominated by SMEs (99.9%) (Bourgeois 2006a, 2006b, 2006c, 2006d). These SMEs are mostly small with no or few employees; only 2.5% of businesses having more than 50 employees. So if e-commerce offers the most potential to SMEs, then the Atlantic Canadian economy would be greatly impacted by SMEs embracing the technology (ACOA 2005). There is very little research published on SMEs' e-commerce adoption in the region and, based on the characteristics of SMEs, most of them would not have been included in government research initiatives. Therefore, there is a clear lack of research in the area on e-commerce use and adoption.

1.3 Research Problem and Research Question

In brief, there is little to modest research that focuses on the adoption of e-commerce by SMEs. Within Canada there is even less literature on the subject and almost none that focuses on Atlantic Canada. Therefore, the dissertation will seek to address this problem and gain a better understanding of the issue by building a cohesive e-commerce adoption model using various sources of research as its base. Additionally, there is a lack of research on the use and frequency of use of e-commerce by Atlantic Canadian SMEs. The dissertation will also address this problem.

Main Research Question: What is the nature and extent of e-commerce adoption in Atlantic Canadian SMEs and does the proposed model in this research explain the variance in SMEs intentions to adopt or further adopt e-commerce?

In addition to the main question, the research will also attempt to use the adoption model to explain current use of e-commerce. While this is not the main goal of the study, predictor models have been used in the past to explain current usage. The results from the research will also be used to examine the nature and exten of e-commerce use in the region.

1.3.1 General Plan and Objectives for this Research

Stage one: Exploratory

The exploratory stage started with a review of innovation, IT and e-commere literature and the subsequent creation of a list of factors that have consistently influenced adoption intentions in other studies. Literaure specific to e-commerce adoption in Canada and then Atlantic Canada was examined and additional facilitators of adoption were considered and added to the previously discussed list. Research on SMEs was then reviewed to confirm that they are unique organizations when compared to larger businesses and once this was confirmed their characteristics that may influence adoption of e-commerce were noted. A preliminary model was then developed based on the stongest and most consistent facilitators found in the research. The preliminary model also took into account the unique characteristics of SMEs.

Stage two: Confirmatory/disconfirmatory

In stage two, the preliminary model was examined using multiple methods including, case study and survey research with SMEs in Atlantic Canada. The results from this research were used to further study the model. After considering the results from the case study and survey research a final model and questionnaire were created to be used in a large scale survey.

Stage three: Theory testing

A large scale survey was used to determine if the model does explain e-commerce adoption intentions in Atalntic Canada. In addition the results from the survey were used to conclude if the model explains current e-commerce usage, to identify facilitators of e-commerce adoption and to examine the nature and exten of e-commerce use.

1.4 Justification for this research

The proposed research can be justified by a number of factors including the current gaps in the literature; the importance of e-commerce to business specifically SMEs in the Atlantic Canada region; and the potential benefits to theory and practice.

1.4.1 Gaps in the Literature

There are a number of limitations and gaps in e-commerce research. There is little research on SMEs' adoption of e-commerce as the majority of researchers have focused on larger businesses and ignored the fact that SMEs are unique business units (Levenburg & Magal 2005; Wymer & Regan 2005; Premkumar 2003). Research also suffers from a lack of empirical studies (Premkumar 2003), a lack of studies that compare models or facilitators (Wymer & Regan 2005; Plouffe, Hulland & Vandenbosch 2001), and a lack of clearly defined constructs or terms (Wymer & Regan 2005; Vekatesh et al. 2003). Furthermore, much of the e-commerce adoption research is retrospective and does not occur at the time of the adoption decision. This retrospective research may result in respondents describing how they feel or what they think today rather than at the time of adoption (Harrison, Mykytyn & Riemenschneider 1997; Tornatzky & Klein 1982). In brief, there is a lack of e-commerce adoption research that deals with real time business decisions in SMEs.

In addition to the gaps in e-commerce adoption research, more problems exist with the lack of research in Canada and within Atlantic Canada. To date there has been little research on smaller SMEs within Canada as the major government agencies discussed in the background Section (1.1) did not survey firms with fewer than 20 employees or those with less than $250,000 in revenue ($150,000 for service businesses only) (Fast Forward 5.0 2004; Johnston, McClean & Wade 2004). As the majority of business within Canada, and almost all the businesses in Atlantic Canada, would not meet these survey requirements there is very little known about e-commerce in smaller businesses. In summary, there is a lack of research on SMEs' e-commerce adoption and very little is known about the use of e-commerce by SMEs in Atlantic Canada.

1.4.2 The Importance of e-commerce

Numerous studies have indicated that e-commerce is reshaping how companies operate (Fast Forward 5.0 2004; MacGregor & Vrazalic 2004). Reseach has noted that SMEs that adopt e-commerce gain many benefits including increased revenue, reduced costs, and improved profits (Johnston, Wade & McClean 2007; Lohrke, Franklin & Frownfelter 2006). As such the use of e-commerce is important to SMEs

and the success of their business. Furthermore, as discussed above, the success of SMEs is vital to both the Canadian and Atlantic Canadian economies.
Unfortunately, research understands very little about the adoption practices of Atlantic Canadian SMEs, including such things as what facilitates adoption, why firms are failing to adopt sophisticated technologies, and what technologies SMEs are and are not using (Fast Forward 5.0 2004). Only by gaining an understanding about these issues can government, economists and so forth provide solutions.

1.4.3 Benefits to the Research and Practice

As noted above there has been very little research on SMEs' e-commerce adoption. Furthermore, the research has rarely tried to unify the research that has been completed to date (Wymer & Regan 2005). This dissertation reviews all the relevant research to date then forms a unified model based on the results of the literature review, case studies and pilot testing. The model is then tested on a large scale sample. This work benefits research by completing an extensive literature review, comparing and contrasting theories, and creating a unified model that will be statistically tested. The testing of the model should result in an improved understanding of facilitators of e-commerce adoption overall and specifically within Atlantic Canada. The research also establishes the use and frequency of use of e-commerce in Atlantic Canada, which will serve as a benchmark for further study.

The research has many practical applications. First, by understanding the nature and extent of e-commerce use in Atlantic Canada, governments, economists, vendors and consultants will be able to establish what technologies are needed in the market. Furthermore, the testing of the model will increase the understanding of why firms adopt e-commerce and should aid various groups in encouraging e-commerce adoption throughout the region.

1.5 Research Approach and Methodology

In order to answer the research question, the research is structured in the following phases:

1. Development of a preliminary model after completing a comprehensive literature review;
2. Testing the preliminary model using both case studies and surveys;
3. Confirmation of the research model;
4. Testing the research model using a large scale survey.

The first phase undertakes a comprehensive literature review and includes studies on innovation adoption, IT adoption, IT adoption in SMEs, and e-commerce adoption in SMEs. A preliminary model is then constructed based on this research and literature on Canadian SME e-commerce adoption, SME management practices and the unique characteristics of Atlantic Canada.

The second phase of the research consists of two pilot studies that were used to assess the preliminary model (see Chapter 3 – Sections 3.3 to 3.6). Owners or managers of SMEs were selected as the target respondents as research has indicated that they are the ones most likely to make e-commerce adoption decisions (Fast

Forward 5.0 2004, 4.0 2003). Pilot studies are used as they have been determined to be useful in defining and/or refining research models and testing the instrument (Zikmund 2003; Cooper & Schindler 2001, 1998). In addition, Flyvbjerg (2006) and Sekaran (2003) concluded that case studies, specifically interviews with knowledgeable participants, are useful in gaining a better understanding of a research problem and narrowing down the scope of research. Furthermore, Yin (1994) stated that case studies are useful in the establishment of theories that can be further tested. The second pilot study consists of a full pre-test on SMEs in Atlantic Canada. This was completed by testing the research instrument and the model on SMEs in Atlantic Canada. As noted by Cooper and Schindler (2001), such pre-testing assists in ensuring the data collection process is sound and further confirming the research approach (model).

The third phase consists of reviewing the preliminary model based on the information garnished in the pilot studies (see Chapter 4). The pilot studies are useful in confirming some aspects of the preliminary model and help shape the final questionnaire.

The fourth phase involves a large scale survey on SMEs in Atlantic Canada (see Chapter 3; Sections 3.6 – 3.8). Surveys were selected as they allow for accurate assessment of information about a population and enable the testing of research models (Zikmund 2003). Telephone surveys were chosen as they would ensure confirmation about who is providing answers to questions and they allow for the clarification of terms (Zikmund 2003). The survey results are then assessed using various statistical tools including the calculations of percentages, mean scores and multiple regression. The large survey provides the following:

1. An understanding of the nature and extent of e-commerce use in Atlantic Canadian SMEs.
2. An understanding of the nature and extent of webpage use by SMEs in Atlantic Canada.
3. An understanding of SMEs' e-commerce adoption intentions.
4. An increase in understanding of facilitators pertaining to current e-commerce use among Atlantic Canada SMEs.
5. An increase in understanding about the facilitators of Atlantic Canadian SMEs intentions to adopt e-commerce.

1.6 Outline of the thesis

There are six chapters in this dissertation. The first chapter discusses the background of the research, introduces the research questions and subsequent questions. In addition, the chapter provides justification for the research, provides an overview of the research methodology used, outlines the entire dissertation, defines key terms, addresses the issues of deliminitations and assumptions, and ends with a summary.

Chapter 2 consists of an extensive literature review that starts with innovation adoption literature and narrows in scope to IT adoption, then IT adoption by SMEs to e-commerce adoption by SMEs, to e-commerce adoption in Canadian SMEs, and finally ends with a discussion of e-commerce adoption and Atlantic Canada SMEs. The chapter also discusses the impact that SMEs' unique management structure will

have on e-commerce adoption decisions and concludes with an examination of the Atlantic Canada region. After reviewing all the literature a preliminary model is developed.

Chapter 3 describes and justifies the research methodology. The chapter outlines the pilot studies used in this dissertation and examines the data collection procedures and the subsequent analysis. The chapter then discusses the development of the final survey instrument, justifies the data collection method, and explains how the survey results will be statistically analyzed. The chapter concludes with a discussion of limitations and ethical considerations.

Chapter 4 presents the results from the two pilot studies. First, the case studies are examined and their impact on the research is discussed. This is followed by a discussion of the results from the pre-test of the instrument and an analysis of the data. Once again the chapter addresses the impact of the results on the preliminary model. The chapter concludes with a presentation of the final model.

Chapter 5 presents the results from the full survey. The chapter opens with a discussion of the demographic data, followed by an analysis of the nature and extent of e-commerce use among Atlantic Canada SMEs. The chapter then provides an analysis of the model using multiple regression.

Chapter 6 presents the conclusions from the research. The main research problem is addressed along with other questions. The contributions to theory and practice are then discussed, followed by an examination of limitations and recommendations for future research.

1.7 Definitions

Some of the terms used in this research are commonly used in multiple contexts, often with different meanings. This section will examine some of the terms that are used in this dissertation in order to clarify their meaning in the context of this research.

1.7.1 E-commerce

E-commerce and e-business have been defined in a number of different ways ranging from the simple to the complex. In relation to the quantity of definitions, MacGregor and Vrazalic (2004) note that there are almost as many different definitions of the term as there are articles about the subject, while Daniel and Grimshaw (2002) conclude that there is no agreed upon definition of the term. Some authors have drawn a clear distinction between the terms e-commerce and e-business, defining the former specifically in terms of the buying or selling of goods or services on the Internet, while the latter is expanded to include business activities that extend far beyond that of just sales. For example Kalakota and Whinston (1997) define e-commerce as follows:

> *'The use of electronic means and technologies to conduct commerce, including business-to-business and business-to-consumer interactions; web-*

based electronic commerce refers to the use of the Internet to conduct electronic commerce' (p. 102).

Wu, Mahajan and Balasubramanian (2003) define e-business as:

'The use of Internet technologies to link customers, suppliers, business partners, and employees using at least one of the following: (a) e-commerce websites that offer sales transactions, (b) customer-service websites, (c) intranets and enterprise information portals, (d) extranets and supply chains and (e) IP electronic data interchange' (p. 425-426).

Many authors have chosen not to draw a distinction between the two terms when presenting their research. In a review of over 60 research papers that dealt with e-commerce or e-business, approximately 20 papers presented a definition of either term (see Table 1.1), with only a handful of papers indicating any distinction between e-commerce and e-business. The consensus that has emerged in the reviewed papers has been to use the terms interchangeably under an expanded definition that refers to much more than just the selling of goods or services online. This dissertation will use the term e-commerce as it is familiar among participants in the geographical area of the research and will adopt a broad definition of the term, similar to Daniel and Wilson (2002) and Daniel, Wilson and Myers (2002) who base their definitions on those developed by Kalakota and Whinston (1997) and The Cabinet Office (1999). The definition used is as follows:

E-Commerce: The use of Internet technologies including, but not limited to, e-mail, EDI, electronic transactions, Intranets, and websites to exchange or share information, maintain or build business relations, and conduct transactions.

In addition, the researcher may use e-commerce technologies interchangeably with the term e-commerce.

Table 1.1: E-Commerce and e-Business defined

Authors	Terminology Used & Definition
Ching and Ellis 2004	E-Commerce: Internet-related applications to support marketing operations, management and decision making in business (p. 410).
Damanpour 2001	E-Commerce: any net business activity that transforms internal and external relationships to create value and exploit market opportunities driven by new rules of the connected economy (p. 36).
Daniel and Wilson 2002	E-Commerce (based on two definitions): 1. The buying and selling of information, products and services via computer networks, the computer networks primarily being the Internet (cited in Kalakota & Whinston 1997, p. 3) 2. Encompass not only the buying and selling described above but also the use of Internet technologies, such as e-mail and intranets, to exchange or share information either within the firm itself or with external stakeholders (cited in The Cabinet Office 1999). Note – Do not present a final definition but base a definition on these two with an emphasis on the latter
Daniel, Wilson and Myers 2002	E-Commerce: based on two definitions: 1. The buying and selling of information, products and services via computer networks the computer networks primarily being the Internet (cited in Kalakota & Whinston 1997, p. 3). 2. Encompass not only the buying and selling described above but also the use of Internet technologies, such as e-mail and intranets, to exchange or share information either within the firm itself or with external stakeholders (cited in The Cabinet Office 1999). Note – Do not present a final definition but base a definition on these two with an emphasis on the latter.
Grandon and Pearson 2004	E-Commerce: business activities conducted using electronic data transmission via the Internet and the WWW (p. 81; adopted from Schneider & Perry 2000).
Grandon and Mykytyn 2004	E-Commerce: the process of buying and selling products or services using electronic data transmissions via the Internet and the WWW (p. 44).
Houghton and Winklhofer 2004	E-Commerce: the buying and selling of goods online (p. 371; adopted from Daniel, Wilson and Myers 2002).
Looi 2005	E-Commerce: general term for the conduct of business with the assistance of telelcommunications, and of telecommunications-based tools (p. 67; adopted from Clark 2001).
MacGregor and Vrazalic 2004	E-Commerce: any net business activity that transforms internal and external relationships to create value and exploit market opportunities driven by new rules of the connected economy (p. 12 adopted from Damanpour 2001).
Poon and Swatman 1999	E-Commerce: the sharing of business information, maintaining business relationships, and conducting business transactions by means of Internet-based technology (p. 9; modified from Zwass 1994).

Authors	Terminology Used & Definition
Raymond 2001	E-Commerce – functions of information exchanges and commercial transaction support that operate on telecommunications networks linking business partners (p. 411).
Rao, Metts and Monge 2003	E-commerce can be defined as: the business model where transactions and interactions of information and data are primarily conducted between businesses and between customers, using electronic means in order to complete those processes more effectively and efficiently across the spectrum of a business (p. 12; following TechRepublic 2000 and Davies and Garcia-Sierra 1999).
Riemenschneider and McKinney 2001 – 2002	Electronic commerce: the use of electronic means and technologies to conduct commerce, including business-to-business and business-to-consumer interactions; web-based electronic commerce refers to the use of the Internet to conduct electronic commerce (p. 102).
Sawhney and Zabin 2001	E-Business: use of electronic networks and associated technologies to enable, improve, enhance, transform or invent a business process or business system to create superior value for current or potential customers (p. 15).
Scupola 2002	Electronic Commerce: the sharing of business information, maintaining business relationships, and conducting business transactions by means of telecommunications networks (p.1; adopted from Zwaa 1997).
Wu, Mahajan and Balasubramanian 2003	E-Business: the use of Internet technologies to link customers, suppliers, business partners, and employees using at least one of the following: (a) e-commerce websites that offer sales transactions, (b) customer-service websites, (c) intranets and enterprise information portals, (d) extranets and supply chains and (e) IP electronic data interchange (p. 425-426; citation taken from Information Week research survey 1999).
Zhu, Kraemer and Xu 2002	E-business: the electronic preprocessing, negotiation, performance and post-processing of business transactions between commercial subjects over the Internet (p. 339).

1.7.2 Adoption, Facilitators, Sophistication

When examining decisions by firms to incorporate e-commerce into their company's business practices, the researcher recognizes that this occurrs in stages. The staged adoption was either by design or due to the increasing innovation in e-commerce tools, which have resulted in new technologies being constantly introduced to the marketplace. Many of these technologies are unavailable to SMEs for a variety of reasons (costs, ability to locate vendors and so forth). The stages discussed in this dissertation are adoption and subsequent adoption where a firm increases their use of e-commerce.

The definition of '**adoption**' in terms of this research will refer to the the initial decision made by SMEs to use e-commerce where e-commerce can be any of the technologies encapsulated in the e-commerce definition. Thus the definition should read:

Adoption: SMEs decision to start using at least one of the e-commerce technologies referred to in the e-commerce definition

This definition is partly based on Rogers' (1995) definition of adoption: *'a decision to make full use of an innovation as the best course of action available'* (p.21). Initially, the researcher considered adopting Rogers' full definition, but upon reflection opted to present a modified version. The reasoning behind the decision included that the research is using a broad definition of e-commerce and Rogers' definition refers to making 'full use' of a technology - something that would be increasingly hard to accomplish with e-commerce in the context of this research. Furthermore, it is questionable whether a firm has to make full use of a technology in order to be adopting the technology and it is difficult to ascertain if the decision to adopt is the 'best course of action,' which is included in Rogers' definition.

As firms will rarely adopt all e-commerce technologies at once, the dissertation will need to refer to SMEs that increase their use of the technology. For this purpose the research will use the terms **sophistication, intensity** and **extent** of adoption interchangeably. Therefore the three terms will all refer to: **'the increased use of e-commerce by an organization that had previously adopted the technology.'** Therefore, when the researcher is stating that a firm has increased its use of e-commerce, it may be said that they increased the sophistication of their e-commerce use; increased the intensity of their e-commerce use; or increased the extent of their e-commerce use.

1.7.3 Small and Medium Enterprises (SMEs)

SMEs have been defined in research using a variety of terms and parameters. Prior to selecting a definition for this study, the research reviewed the relevant literature to determine if a consistent definition did exist and/or if researchers used consistent parameters. The review of the literature resulted in the conclusion that the most consistent parameter used in defining SMEs was the size of the firm as determined by the number of employees. McDonald and Wiesner (1997) found that while researchers sometimes considered the type of ownership, nature of management process, value of assets and so forth, the size of the firm as measured by the number of employees was the most frequently used defining factor. Their research was supported by Atkins and Lowe (1996) who reported that of 50 empirical studies, 34 used the number of employees to determine the classification of the firm as small, medium or **large. Based on the research, this dissertation will define and/or classify firms by the number of employees.**

While there is consistency on how to define SMEs, research offers little consistency in determining the maximum number of employees in SMEs. Scupola (2002) notes that there is no accepted definition of SMEs a statement that is echoed by other researchers, including Grandon and Pearson (2003) and Thong (1999). Upper limits as high as 500 employees have been suggested as a definition of SMEs, while other researchers use smaller maximums and some make use of minimums (ACOA 2005; Hornsby & Kuratko 1990). Since this dissertation is focusing on the use of e-commerce by Canadian SMEs, the research attempted to focus on how SMEs are defined in the context of e-commerce and IT literature prior to examining how the term is defined in Canada. After reviewing e-commerce and IT literature, the researcher found that no consistent definition existed as evident in Table 1.2 which provides a sample of definitions used in the research.

Table 1.2: Definitions of SMEs in e-commerce and IT literature

Author	Definition
Cloete & Courtney 2002	For this research we classified a business as an SME if it has a single CEO and not more than 50 employees' (p. 1).
Daniel, Wilson & Myers 2002	'…SMEs are defined in accordance with the UK Department of Trade and Industry (DTI 1999), as firms with less than 250 employees. No other constraints were placed on the population, such as industry sector or geographic location' (p. 257).
Grandon & Pearson 2003	'We have used less than 500 employees' (p. 203).
Mehrtens, Cragg & Mills 2001	The definition of an SME for the current research was an independent organization with 200 or less employees. It was also important that the organizations had adopted at least one of the following parts of the Internet: e-mail, Internet browsing, or a web site. With respect to the non-adoptor, the organization had made a conscious decision not to adopt the Internet' (p. 167).
Purcell 2002	According to the department of Trade and Commerce Industry, an SME is defined as a 'company providing goods and services employing up to 5 employees and a manufacturing company employing up to 40 employees' (p. 1).
Thong 1999	'A small business is one that satisfies at least two of the following criteria: 1. the number of employees in the business should not exceed 100 2. the fixed assets of the business should not exceed US$7.2 million 3. the annual sales of the business should not exceed US $9 million' (p. 199).

The lack of consistency in the e-commerce/IT research was also found within Canada where various researchers and government agencies have adopted a variety of definitions for the term. Table 1.3 provides a list of the various terms used in Canadian research.

Table 1.3: Definitions of SMEs found in Canadian Research

Fast Forward 5.0, 2004	SMEs are defined as businesses with fewer than 500 employees' (p. 7).
The Daily, June 6, 2002	Small firms had up to 19 employees, medium firms from 20-99 and large firms 100 or more. For manufacturing industries, medium firms had between 20 and 499, and large firms 500 or more.(p. 1)'
Jopko, Morgan and Archer 2001	SMEs are defined as those businesses with fewer than 300 employees, and small businesses will be defined as those with fewer than 5 employees' (p. 1).
Net Impact 2003	The Canadian study concentrated on firms having between 50 and 500 full-time employees. A stratified random sample was taken form 5 broad industry sectors: manufacturing; financial services; retail, wholesale and distribution; communications and Internet Service Provider; public service' (p. 2)
The State of Small Business and Entrepreneurship	Less than 100 (p. 26)
Canadian Federation of Independent Business 2007	Up to 250 employees (p. 1)
Candian SME Financing Data Initiative	Up to 500 employees (p. 3)

While there appears to be some agreement among researchers that SMEs can include firms up to 500 employees, as evident in the above table, this classification was deemed too large for Atlantic Canadian firms where the study is actually focused. In Atlantic Canada, roughly two percent of firms have more than 200 employees and using a cutoff of 500 employees would include 99.9% of Atlantic Canada firms.

Thus for the purpose of this research:

SMEs: Defined as firms with less than 200 employees

1.8 Future Research

The results of this study have led to several recommendations for future research. The model developed in this study could be replicated in other parts of Canad or internationally. Additionally other facilitators could be added to the model in order to gain a greater understanding of adoption intentions among Atlantic Canada SMEs. Research may also examine the impact of e-commerce adoption in this region. Furthermore a number of longtitudinal studies could be conducted to see if firms acted on their intentions to adopt e-commerce, examine how facilitators change over time and what are the short and long term consequence of adopting or not adopting e-commerce.

1.9 Delimitations

There are a number of delimitations. First, the definition for the term e-commerce (Section 1.6) restricts the use of the term to technologies and/or software that is dependent on the Internet. Wider more encompassing definitions have been used by

other research bodies. For example some Canadian government studies use the term Internet Communications Technology and apply it to any transaction/business process that occurs electronically including fax machines and wireless phones. Limiting the definition to Internet enabled transaction does fit a conventional definition of e-commerce and provides focus to the research.

Due to common research limitations such as time and available capital, the research was limited to SMEs in the Atlantic Canada region. The narrow scope allows for a greater understanding of the research question in the geographical area, but does reduce the generalisability of the research to other geographical areas. The same time and financial limitations also prevented the researcher from conducting longitudinal studies which would have assisted in measuring how attitudes, perceptions and use of the Internet change over time.

Furthermore, the case studies used to shape the research model consisted of personal interviews. Results are dependent on the interviewer preparing appropriate questions (Zikmund 2003; Patton 2002) and a careful examination and interpretation of the results (Zikmund 2003; Patton 2002). Thus the case study questions were screened by colleagues and researchers prior to administrating the interviews and the data were examined and interpreted using appropriate research methods.

1.10 Summary

The purpose of this chapter was to introduce the dissertation. The chapter introduced the background of the research then introduced the research problem and questions. The chapter outlined the general plan for this research, justified the research and examined the research methodology, followed by a summary of the entire dissertation. The chapter then discussed the key tems and definitions used in the dissertations and explored the limitations. The next chapter will discuss the relevant literature and present a preliminary model to explain behavorial intentions to adopt e-commerce.

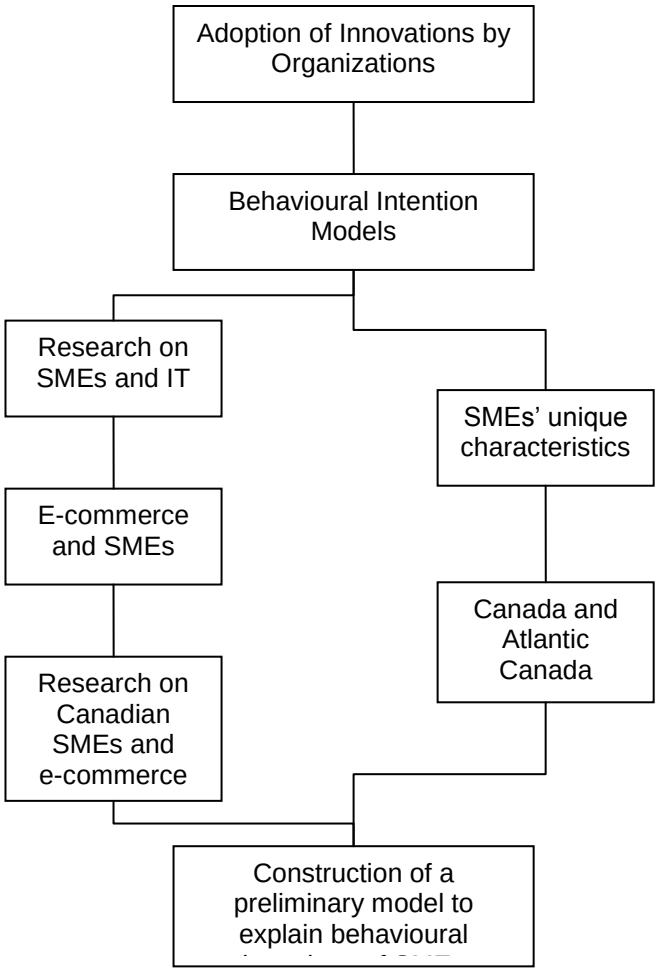
CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Chapter 1 provided an overview of the research problem under investigation. Chapter 2 reviews the relevant literature as illustrated in Figure 2.1 with a focus on studies that investigate adoption of innovations by organizations including innovations in general, information technology (IT) in general, IT in small and medium businesses (SMEs), and e-commerce in SMEs. Studies on the adoption of e-commerce by Canadian SMEs, specifically Atlantic Canadian SMEs, are also included as they are important to the investigation. In addition, studies discussing the unique characteristics of SMEs are significant and are incorporated into this chapter. Background information on the Atlantic Canadian region is also provided as the study is based in the area which is known for its distinctive geographical location, economy, and culture.

The literature review used a variety of search procedures to locate the appropriate research. The review started in 2004 and continued up until the summer of 2007. The initial review started in 2004 and lasted until the end of 2005. The researcher initially relied on electronic databases at the start of the review process including Business Source Premier, Proquest, Emerald Insight Management Extra Collection and Google Scholar. These electronic search engines were supplemented by physical searches of five university libraries. As the reviwer extended his search to include Canadian and provincial research he electronically and then manually searched a number of government websites. On more than one occasion he spoke to people in various government departments to access information that was only available in print format. The researcher then revisted his previous findings in 2007 and completed another thorough literature review duplicating the same techniques as employed in the first search.

Figure 2.1: Summary of Literature Review



2.2 Adoption of innovations by organizations

Three major theories that are commonly cited to explain both individual and organizational adoption of innovations are the diffusion of innovation theory (DOI) by Rogers (1995), the theory of reasoned action (TRA) by Fishbein and Ajzen (1975), and the theory of planned behaviour (TPB), which was developed by Ajzen as an extension of TRA (Ajzen 1991). While TRA and TPB were not originally formulated to specifically predict innovation adoption, both theories have been used to explain numerous individual and organizational decisions by explaining behavioural intentions, which have been proven to be a strong predictor of behaviour, such as adoption and/or use (Sheppard, Hartwick & Warshaw 2001; Harrison, Mykytyn & Riemenschneider 1997; Taylor & Todd 1995a, 1995b; Davis, Bagozzi & Warshaw 1989). While some researchers have described these theories as competing models, they are similar in that they posit that a number of independent variables influence intention to act and that intentions are the best predictor of future behaviour (Venkatesh et al. 2003; Moore & Benbasat 1991; Taylor & Todd 1995a, 1995b). All three models are applicable to a wide variety of innovation decisions, including organizational adoption, thus making them of interest to this research.

2.2.1 Diffusion of Innovation

As noted above the DOI theory posits that a number of independent variables influence adoption of innovations. The model breaks the independent variables down into two separate categories with the first category, innovation characteristics, directly influencing adoption rates, and the second category, organizational characteristics, acting as either an accelerating or decelerating force, affecting the potential adopter. The first category consists of five characteristics that deal with the perception of the individual or organization that is making the adoption decision. The variables are: 1) Relative Advantage, which is the degree to which an innovation is seen as being better than its precursor, 2) Compatibility, defined as the degree that an innovation is perceived as being consistent with the existing values of an organization, 3) Complexity, defined as the perception that an innovation is complex, 4) Trialability, is the degree that an innovation can be tried on a limited basis, and 5) Visibility, defined as the degree which an innovation can be observed (Rogers 1995).

As noted above the variables in the organizational category can have either a positive or negative effect on adoption. The organizational characteristics are listed in Table 2.1.

Table 2.1: Organizational Characteristics

Positive Characteristics	Negative Characteristics
1. Leaders' attitude towards change by leaders 2. Size 3. Complexity 4. Organizational Slack 5. System Opennessf	1. Centralization 2. Formalization

Rogers (1995) tested the model in a number of innovation adoption decisions and concluded that relative advantage and size are two of the most consistent variables that influence organizational adoption. Tornatzky and Klein (1981) completed a meta-analysis of innovation adoption characteristics with the principal source being Rogers and Shoemaker (1971) and concluded that of the characteristics suggested by DOI, only relative advantage, compatibility and complexity were significant predictors of innovation adoption. While DOI has served as a theoretical base for many studies researchers have concluded that it needs to be enriched for complex technologies, and when it is applied to organizational rather than individual adoption (Gallivan 2001; Eveland & Tornatzky 1990).

2.2.2 Theory of Reasoned Action (TRA)

Unlike DOI, the TRA model was not originally formulated to explain innovation decisions. The model can trace its roots to social psychology and was formulated to explain a variety of consciously intended behaviours (Ajzen & Fishbein 1980; Fishbein & Ajzen 1975). TRA states that a person's behaviour (B) is determined by his or her behavioural intentions (BI), and BI is determined by the person's weighted

attitude (A) and the subjective norm (SN) concerning the behaviour. The model is expressed as:

$$B = BI$$

$$BI = A + SN$$

TRA states that attitude (A) is defined as *'an individual's either positive or negative feelings towards a behaviour,'* and subjective norm (SN) is defined as *'the person's perception that most people who are important to him think he should not perform the behaviour in question'* (Fishbein & Ajzen 1975, p. 302). Attitude is determined by a person's salient beliefs about the consequences of performing a specific behaviour, multiplied by the evaluation of the consequences. Subjective norm is determined by multiplying a person's normative beliefs, or his or her perceived expectations of specific referent individuals or groups, and his or her motivation to comply with these expectations. TRA asserts that any other factors that influence behaviour only do so indirectly by influencing A or SN. While TRA was originally formulated to explain behaviour in situations with specific conditions, Sheppard, Hartwick and Warshaw (1988) completed a meta-analysis of TRA studies and found that the predictive power of the model was consistent and strong in different types of situations, including those that fell outside its original boundaries.

2.2.3 The Theory of Planned Behaviour (TPB)

The theory of planned behaviour extends TRA, to explain behaviours in situations that were seen as outside the original model, specifically situations where an individual does not have complete control over his or her behaviour. Much like TRA, TPB states that behaviour (B) is explained by BI, which is explained by weighted attribute (A) and subjective norm (SN) but TPB adds a new construct perceived behavioural control (PBC) which influences both B and BI (Ajzen 1985, 1991). PBC like A and SN is also weighted and defined as *'the perceived ease or difficulty of performing the behaviour'* (Ajzen 1991, p. 188). Both models theorize that salient beliefs must first be identified for the behaviour being studied and that the findings only explain that behaviour and cannot be generalized to other research (Davis, Bagozzi & Warshaw 1989).

Within the scope of research on TRA and TPB, BI has been proven to be the most significant and consistent predictor of behaviour. Sheppard, Hartwick and Warshaw (1988), in their meta-analysis, pooled the results from 87 studies representing a sample of 12,624 participants and concluded that BI was a strong predictor of behaviour. Furthermore, Todd and Taylor (1995) compared TPB to a Decomposed TPB and the Technology Acceptance Model (TAM), an extension of TRA, and found that BI was the most important determinant of IT usage in all the models. Their research found that BI alone explained almost 30% of the variance in behaviour. Their research is further supported by Davis, Bagozzi and Warshaw (1989) who concluded in a comparison of TRA and TAM, that BI directly influences usage (behaviour) and mediates the effects of all the other variables in TRA and TAM. Subsequent to this research, Davis co-authored a study (Venkatesh et al. 2003) where the authors examined several competing technology adoption models. From the examination, the authors formulated a Unified Theory of Acceptance and

Use of Technology (UTAUT) that used TRA, TPB, TAM, DOI along with several other models as its theoretical base to formulate predictive constructs of BI and behaviour/usage. Their empirical tests of UTAUT concluded that BI directly influenced usage and in fact moderated the other predictors in the model.

When assessing the other constructs posited in TRA and TPB, it was found that a person's attitude, whether positive or negative, has been consistently cited as influencing BI and subsequently behaviour (Sheppard, Hartwick & Warshaw 1988). Research regarding the roles of other constructs such as SN and PBC has been contradictory to date with Davis et al. (1989) and Mathieson (1991) finding that SN does not influence BI, while others, such as Hartwick and Barki (1994) and Moore and Benbasat (1993), conclude that SN does in fact influence BI. Support for PBC can be found in research conducted by Taylor and Todd (1995) and Mathieson (1991). However, Venkatesh et al. (2003) found that facilitating conditions, a construct that is similar to PBC, did not significantly influence BI. The lack of support for PCB was explained by the inclusion of constructs that dealt with effort/ease of use along with effectiveness/usefulness in the same model.

2.2.4 Summary of the Impact of DOI, TRA & TPB

The three models discussed above have been proven to be reliable in explaining the adoption of a variety of innovations, including technology. As such, other researchers have used their constructs as the theoretical starting place for developing technology adoption models. Of these constructs/variables, attitude in TRA and TPB and relative advantage in DOI are the two most common and strongest variables cited in explaining behavioural intentions and behaviour and are usually found in subsequent models. Since BI has been proven to be a strong predictor of future behaviour (adoption), other behavioural intention models that relate directly to technology will be discussed prior to examining SMEs and their adoption of IT and e-commerce.

2.3 Behavioural intention models and factors that influence technology adoption

A number of behavioural intention models have been formulated over the past two decades to explain both individual and organizational decision making. While the behavioural intentions models discussed in this section were all originally intended to explain technology adoption decisions, they are relevant to this research because they were later applied in whole or in part to organizational IT decisions by SMEs. Additionally, discussed further in the literature review, the majority of technology innovation decisions made by SMEs are in fact individual decisions made by the owner-manager which lends credence to their inclusion in the literature review. The following behavioural intention models are discussed in this section:

1. Technology acceptance model (TAM)
2. TAM2
3. Combined TAM and TPB (C-TAM-TPB) & Decomposed theory of planned behaviour (DTPB)
4. Motivational model (MM)
5. Model of PC utilization (MPCU)

6. Innovation of diffusion theory (IDT)
7. Social cognitive theory (SCT)
8. Unified theory of acceptance and use of technology (UTAUT)

2.3.1 The Technology Acceptance Model (TAM)

As stated above, TAM uses TRA as a theoretical starting point for modeling the relationship between variables. TAM postulates that technology adoption can be explained by two constructs: 1) perceived usefulness (PU) and 2) perceived ease of use (PEOU), which influences behavioural intentions. BI and PU then directly influence behaviour (Davis 1989). PU is defined as *'the degree to which a person believes that using a particular system would enhance his or her job performance'* and perceived ease of use as *'the degree to which a person believes using a particular system would be free of effort'* (Davis 1989, p. 320).

Davis (1989) found that TAM, unlike TRA, was generalizable and did not rely on the identification of salient beliefs for different sets of behaviours. This was seen as an improvement, as some researchers have stated that identifying salient beliefs for different behaviours is problematic (Berger 1993). Since Davis first developed TAM, it has been one of the more widely cited behavioural intention models and usually explains between 40-60% of the variance in use (King & He 2006; Venkatesh et al. 2003). Davis noted that PU was the most significant of the constructs as indicated by its direct influence on behaviour. This assertion by Davis, that PU is the most significant construct, received support from King and He (2006) in their meta-analysis of 88 TAM studies.

2.3.2 TAM2

TAM2 was an extension of TAM to include subjective norm (SN). Davis left SN out of the original TAM because TRA studies noted that SN was the least understood aspect of TRA (Ajzen & Fishbein 1980; Fishbein & Ajzen 1975). Venkatesh and Davis (2000) found support for the inclusion of subjective norm in mandatory settings. PU remained the most significant predictor of BI in models that included SN (King & He 2006).

2.3.3 Combined TAM and TPB (C-TAM-TPB) and Decomposed Theory of Planned Behaviour (DTPB)

Taylor and Todd (1995a, 1995b) took TPB and decomposed the belief structure to create DTPB. The DTPB combined the constructs in TAM along with compatibility (Rogers 1983) to explain BI and U. The model, while not being as parsimonious as either TAM or TPB, did explain more variance in BI (Taylor & Todd 1995a, 1995b). Their research noted that a combined TPB and TAM would be an acceptable hybrid model (C-TAM-TPB). The model combines the three constructs from the TPB (A, SN, PBC) with PU from TAM.

2.3.4 The Motivational Model (MM)

MM posits that motivation is an explanation for behaviour. The MM states that two constructs, extrinsic motivation and intrinsic motivation determine behaviour.

'Extrinsic motivation refers to the perception that users will want to perform an activity for a desired outcome, and Intrinsic motivation refers to the desire to complete an activity based on the desire to perform that activity' (Davis et al. 1992, p. 1112). Both Davis et al. (1992) and Venkatesh and Speier (1999) found support for MM, while noting that the two constructs in MM are closely related to PU in TAM.

2.3.5 The Model of PC Utilization (MPCU)

MPCU was developed by Thompson et al. (1991) and consists of six constructs that are theorized to influence personal computer (PC) utilization. While the model was not originally designed to predict BI, it is structured in a way that lends itself to that use and as such should be included in any discussion about competing behavioural intention models (Venkatesh et al. 2003). The constructs in the model are as follows: '*1) Job fit - extent that a person believes using technology can enhance the performance of his or her job, 2) Complexity - the degree to which an innovation is perceived as relatively difficult to understand and use, 3) Long term consequences - long term payoffs in the future, 4) Affect towards use - the feelings towards an act, 5) Social factors - internalization of the reference group's subjective culture and specific interpersonal agreements that the individual has made with others, in specific social situations, and 6) Facilitating conditions - conditions that make an act easy to accomplish'* (Thompson et al. 1991, p. 126-129). Job fit, much like PU in TAM and RA in DOI, was determined to be the most significant predictor of intentions (Venkatesh et al. 2003).

2.3.6 The Innovation Diffusion Theory (IDT)

IDT is based on Roger's (1983, 1995) work on the diffusion of innovations. Moore and Benbasat (1991) developed constructs and an instrument that adapted the characteristics of an innovation (Rogers 1983) to individual technology acceptance. The constructs used by Moore and Benbasat are '*1) Relative advantage - the degree to which an innovation is seen as being better then its precursor, 2) Ease of use - the degree to which an innovation is perceived as difficult to use, 3) Image - the degree that one perceives use of an innovation will enhance one's status, 4)Visibility – the degree to which one can see others using the system, 5) Compatibility - the degree that the innovation is perceived as being consistent with the existing values, needs and past experiences of potential adopters, 6) Results demonstrability - the tangible results of using the innovation, and 7) Voluntarism of use - the degree to which the use of the innovation is viewed as voluntary'* (Moore & Benbasat 1991, p. 195). Much like Rogers research on innovation adoption, relative advantage was found to be the most significant predictor of intention to adopt (Venkatesh et al. 2003; Plouffe et al. 2001; Agarwal & Prasad 1997).

2.3.7 The Social Cognitive Theory (SCT)

SCT was originally developed by Compeau and Higgins in 1995 to explain computer utilization but is extendable to BI and use (Venkatesh et al. 2003). SCT contains the following five constructs: *'1) Outcomes expectations performance - how the adoption of technology will impact job related functions, 2) Outcomes expectations personal - personal consequences of behaviour for example self esteem,*

achievement, etc., 3) Self-efficacy - judgment of one's ability to use a technology, 4) Affect - whether a person likes or dislikes a behaviour or task, and 5) Anxiety - evoking anxiety as a result of performing a task' (Compeau & Higgins 1995a, 1995b, p. 189 – 192, p. 130 - 132). Much like previous researchers, Compeau and Higgins (1995a, 1995b) found the strongest support for constructs related to outcomes.

2.3.8 The Unified Theory of Acceptance and Use of Technology (UTAUT)

UTAUT was developed in an attempt to explain more variance in use than the traditional BI models discussed above (Venkatesh et al. 2003). Previous to the formation of UTAUT, BI models roughly explained between 30-60% of the variance in use, leaving between 70 - 40% of the variance unexplained. Venkatesh et al. developed the UTAUT model by first comparing various BI models following a stringent research methodology as suggested by other researchers, including Rogers (1995), Davis (1989), and Tortnatky and Klien (1982). Venkatesh et al. measured adoption perceptions at the time of the adoption decision, thus avoiding criticism associated with retrospective surveys. They also used real world workers, not students, and measured perceptions at various intervals in time. All of these conditions were posited by Rogers (1995), Tortnatkzy and Klein (1982), Davis (1989), Mathieson (1991), and Taylor and Todd (1995a, 1995b) to be important in studies that are designed to explain technology adoption.

After completing the comparison, Venkatesh et al. 2003 selected the constructs that were the most significant predictors of BI and integrated them into a new unified theory of acceptance and use of technology (UTAUT). UTAUT consists of four constructs that directly influence BI, which in turn influence behaviour. The constructs in the model are: *'1) Performance expectancy, defined as the degree to which an individual believes that using the system will help him or her to attain gains in job performance, 2) Effort expectancy, defined as the degree of ease associated with the use of the system, 3) Social influence defined as the degree to which an individual perceives that important others believe that he or she should use the new system, and 4) Facilitating conditions, defined as the degree to which an individual believes that organizational and technological infrastructure exist to support and use the system. It should be noted that facilitating conditions did not have an impact on BI and only influenced usage* (Venkatesh et al. 2003, p. 450 - 455).

Venkatesh et al. then proceeded to test the new model and compare the results to the other BI models that make up UTAUT's theoretical base. The resulting tests found that UTAUT explained more variance in BI and behaviour. UTAUT was then tested again on a different set of subjects with significant results. Overall Venkatesh et al. concluded that UTAUT explained upwards of 70% of the variance in use.

2.3.9 Summary of Facilitators Identified in Behavioral Intention Models

In conclusion, research on innovation adoption and technology adoption has found similar factors, albeit with different labels, influence adoption. The UTAUT model incorporates the most significant constructs from the other BI models discussed above including perceived usefulness, relative advantage, and ease of use, complexity, subjective norm, compatibility, and perceived behavioural control of resources. However, the UTAUT model has only been applied in employee adoption

situations, not organizational adoption decisions, and it fails to account for factors that are specific to SMEs or the technology itself. Furthermore, it has only been tested in a small number of studies and in limited situations. Thus it makes sense to extend the literature review to look at organizational adoption of IT and e-commerce. Prior to this, the dissertation will discuss whether or not SMEs are different from larger businesses to see if it is pertinent to narrow the scope of the literature review to adoption decisions made by small or medium-sized enterprises.

2.4 Small Businesses are not Simply Smaller Versions of Big Businesses

This segment will address the question of whether SMEs are in fact different from larger businesses. If SMEs are unique it would be practical to limit the examination of adoption literature to SMEs as this is the type of business that the dissertation is focused on. If small businesses are homogenous with their larger counterparts then the literature review can be extended to study all adoption literature regardless of the size of the companies in the study.

There is a great deal of discussion and research about SMEs' characteristics. The common findings in these studies are that SMEs operate very differently than large businesses. Welsh and White (1981) and Westhead and Storey (1996) both drew similar conclusions in papers written 15 years apart when they noted, SMEs are not smaller versions of large businesses but SMEs are unique business organizations. As previously stated in the Definition section (Section 1.7) of this dissertation, the definition of SME differs dramatically from author to author. While the lack of one definition makes comparisons difficult, it does not make them impossible, as almost all of the past research draws the same conclusion, that SMEs differ from large businesses. For convenience this research is summarized in Table 2.2.

Table 2.2: Summary of SMEs' Unique Characteristics

Do Not Use Strategic or Management Planning Tools	Ambo-Rao & Pendse 1985 Barnes et al. 1998 Cassell 2001 CIMA 1993 Delisle & St-Pierre 2004 Hisrich et al. 2006 Hudson, Lean & Smart 2001 Husdon et al. 1999, 2000 Jennings & Beaver 1995 Kotler, Armstrong & Cunningham 2005 Lyles et al. 1996 Matthews & Scott 1995 Mintzberg 1979 Monkhouse 1995 O'Gorman & Doran 1999 Raymond, Brisoux & Abdellah 2001 Stonehouse & Pemberton 2002 Veitch & Smith 2000 Welsh & White 1981 Woods & Joyce 2003
Financing: Difficulty Attracting External Funds	Berger & Udell 1998 Binks & Ennew 1996 Cromie 2000

	Elgin, Licht & Steil 1997 Hughes 1997 Pissarides, Singer & Svejnar 2000 Welsh & White 1981
Financing: Heavy Reliance on Banks for Funds	Cosh, Duncan & Hughes 1996 Hughes 1997 Medium-Sized Enterprise Financing in Canada 2003 Scott, Dunkelberg & Dennis 2003 St-Pierre, Beaudoin & Desmarais 2002
Financing: Lack of Money Restricts Capital Investment and Growth	Berger & Udell 1998 Binks & Ennew 1996 Cromie 2000 Elgin, Licht & Steil 1997 Hughes 1997 Pissarides, Singer & Svejna 2000 St-Pierre, Beaudoin & Desmarais 2002 Survey of Small & Medium-Sized Enterprises in Canada 2003 Welsh & White 1981
Financing: Majority of Financing is Short-term	Berger & Udell 1998 Binks & Ennew 1996 Cromie 2000 Elgin, Licht & Steil 1997 Hughes 1997 Pissarides, Singer & Svejna 2000 Welsh & White 1981
Financing: Owner Contributes or Guarantees the Majority of Funds	Berger & Udell 1998 Hisrich et al. 2006 Hughes 1997 Pissarides, Singer & Svejnar 2000 Scott, Dunkelberg & Dennis 2003 St-Pierre, Beaudoin & Desmarais 2002 Study of Canadian Small & Medium-Sized Business Financing 2003
Focus on short term planning	Ambo-Rao & Pendse 1985 Carroll, Marchington & Earnshaw 1999 Handy et al. 1988 Jennings & Beaver 1995 Robinson, Logan & Salem 1986 Lyles et al. 1993 Mintzberg 1979 Mathews & Scott 1995 Stonehouse & Pemberton 2002 Welsh & White 1981 Woods & Joyce 2003
Highly Centralized Structure	Berger & Udell 1998 Carson & Cromie 1989 Charan, Hofer & Mahon 2001 Churchill & Lewis 1983 Deakins 1996 Feltham, Feltham & Barnett 2005 Hambrick & Finkelstein 1987 Jennings & Beaver 1995 Keats & Bracker 1988 Matlay 1999 Mintzberg 1979 Papadaki & Bassima 2002 Small & Meduim-Sized Enterprise Financing in

	Canada 2003 Tashakori 1980 Van Gils 2005
Human Resource Practices: Informal	Atkinson & Storey 1994 Bourgeois 2006a, 2006b, 2006c, 2006d Carroll, Marchington & Earnshaw 1999 Heneman, Tansky & Camp 2000 McEvoy 1984
Human Resource: Recruitment & Retention Problems	Golhar & Deshpande 1997 Hornsby & Kuratko 1990 Mathis & Jackson 1991
Human Resources: SMEs Employ Generalists not Specialist	Cragg & King 1993 Wager 1998
Human Resources: SMEs Provide Less Compensation	Amba-Rao & Pendse 1985 Atkinson & Storey 1994 McEvoy 1984 Morissette 1993
Influence of Owner's Personality	Miller & Toulouse 1986 Mintzberg 1979
Informal Decision Making	Ambo-Rao & Pendse 1985 Jennings & Beaver 1995 Matlay 1999 Mintzberg 1979 Smith et al. 1988 Welsh & White 1981 Woods & Joyce 2003
Lack of Business or Strategic Planning	Ambo-Rao & Pendse 1985 Gibson & Cassar 2002 Jennings & Beaver 1995 Lyles et al. 1993 Mass Mutual Financial Group &the Raymond Institute 2001 Mintzberg 1979 Peel & Bridge 1998 Perry 2001 Robinson & Pearce 1984 Robinson, Logan & Salem 1986 Robison & Pearce 1983 Sexton & Van Auken 1985 Stonehouse & Pemberton 2002 Welsh & White 1981 Woods & Joyce 2003
Lack of Financial Planning Tools	Lazaridis 2004 McMahon & Holmes 1991 Peel & Bridge 1998
Lack of Outside Assistance and Scrutiny	Feigener et al. 2000 Harris 1989 Hisrich et al. 2006 Huse 1998 Mace 1971 Mintzberg 1979
More Susceptible to Shocks in the External Environment	Baldwin et al. 2000 Birley & Niktari 1995 Everett & Watson 1998 Hill & Stewart 2000 Hughes 1997 Peterson, Kozmetsky & Ridgway 1983 Gavin 1992 Westhead & Storey 1996

Owner Not Pursuing Growth	Baldwin et al. 2000 Hisirich et al. 2007 Storey 1994
Owners' Control of Decisions	Berger & Udell 1998 Carson & Cromie 1989 Churchill & Lewis 1983 Feltham, Feltham & Barnett 2005 Matlay 1999 Miller & Droge 1986 Mintzberg 1979 Papadaki & Bassima 2002 Small & Meduim-Sized Enterprise Financing in Canada 2003 Van Gils 2005
Riskier/More likely to Cease Operations	Baldwin et al. 2000 Berger & Udell 1998 Brigham & Smith 1967 Cochran 1981 DeLone 1988 Harrison & Mason 1987

When examining the literature on SMEs, it became apparent that SMEs are most unique in their approach to management, finance, and how they are impacted by their external environments. This distinctiveness of SMEs identified in this section provides justification for limiting the literature review to studies on SMEs and their adoption of IT or e-commerce.

Turning toward the functional business area of management, SMEs are unique in how they structure their businesses, make decisions, plan for the future, and practice human resource management. After reviewing the literature, it became clear that a discussion on the unique features of SMEs should start with management practices, as this area accounts for many of the differences between SMEs and large businesses. This section will examine decision making in SMEs, illustrate how SMEs lack the management scrutiny that is common in larger businesses, discuss how SMEs decision making is informal, focusing on the short term, making very little use of common decision making tools or planning, and conclude by addressing how SMEs deal with human resource management.

2.4.1 Centralized Structure

CEOs of small firms tend to develop informal, highly centralized control systems and simple organizational structures that enable them to manage operations in a direct and personal way (Churchill & Lewis 1983; Tashakori 1980). Charan, Hofer and Mahon (2001) conducted observations of real-life situations in small and medium-sized firms and concluded that the decision making process is highly centralized and is usually dominated by the founder and one key associate. In a comprehensive review of small business literature, Jennings and Beaver (1995) conclude that SMEs operate in a centralized structure and that the SME owner and his personal characteristics are highly influential in the running of the small firm. Deakins (1996), Keats and Bracker (1988), and Hambrick and Finkelstein (1987) all found SMEs had a highly centralized structure. Van Gils (2005) found that when CEOs formed management teams, the size of the teams on average consisted of only 1.4 individuals, substantially less than the size of management

teams with large companies. Feltham, Feltham and Barnett (2005) in a Canadian study on family enterprise also concluded that SMEs have centralized management and small management teams compared to large businesses.

2.4.2 Decision making

Findings that SMEs operate with a highly centralized structure are supported by numerous researchers who looked at the decision making process in SMEs. In a three year study, Matlay (1999) completed over 5000 telephone surveys with owner-managers, conducted 600 interviews with owner-managers and employees, and completed 60 case studies. He concluded that in small firms the owner-manager is often the only decision maker. Matlay's findings are consistent with a number of other studies that found the CEO is the main if not the only decision maker in SMEs (Van Gils 2005; Miller & Droge 1986).

Further evidence can be found in a Canadian study of 1337 micro-businesses (firms with less than 5 employees), where 85% of owners indicate that they manage the firm entirely on their own and perform all the day-to-day activities associated with running their company (Small and Medium-Sized Enterprise Financing in Canada 2003; Papadaki & Bassima 2002). Berger and Udell (1998) looked at decision making in the United States, and found that small firms are managed primarily by the owner (86%).

The presence of single owner-manager making the majority of decisions is also strongly present in family businesses. In a national study of decision makers in family businesses in Canada, 65% of owner-managers self reported that they made all major decisions in 3 out of 5 functional areas of management. In addition, 75% of owner-managers stated that the family business was either dependent or very dependent on them (Feltham, Feltham & Barnett 2005). It should be noted that the focus of the study was not exclusively on SMEs, and a requirement for participating was revenue in excess of $1 million. However, 50% of the companies surveyed had fewer than 18 employees which would characterize them as small businesses by a number of researchers and Statistics Canada (ACOA 2005, 1998, 1996). The paper's authors concluded that the dominance of owner-managers would have been even more widespread with the inclusion of companies reporting revenue below the $1 million threshold.

2.4.3 Personality of Owner-Manager

The owner-manager's personality will also influence the operation of SMEs. Miller and Toulouse (1986) completed phone interviews with 97 firms in Quebec, Canada, trying to establish whether or not the personality of CEOs influenced the strategy and structure of small firms. They concluded that the personality of the CEO will influence strategic decisions and organizational characteristics in all small businesses with the impact being strongest in smaller firms (under 100 employees). Mintzberg (1979) came to a similar conclusion about small firms and the personality of owner-operators. He concluded that small businesses develop strategy that is an extrapolation of the chief executive's personality.

2.4.4 Lack of Outside Assistance and Scrutiny

SMEs also suffer from a lack of professional management assistance and scrutiny that is common in larger businesses that usually use a Board of Directors or Advisors (Hisrich et al. 2006). Feigener et al. (2000) concluded that 38.1% of American firms made use of a Board of Directors and most boards of small enterprises consisted chiefly of the owner-manager and family members. Family members were found to be less likely to offer professional management advice and hold management accountable. In a similar study, Huse (1998) indicated that most SMEs do not make use of outside advisors. Other researchers have noted that even when a Board exists, the CEOs of SMEs usually retain control over decision making and can ignore or overrule board members (Harris 1989; Mintzberg 1979; Mace 1971).

2.4.5 Decision Making Style

As indicated above, the main, and often the only, decision maker in SMEs is the owner-manager or CEO. Thus, CEO decision making and management style will have a great deal of impact on how the business is run (Mintzberg 1979). SME decision making and management styles are unique, as the owner-managers or CEO often focus on the short term, are informal in their approach to management practices basing decisions more on personal intuition rather than strategic management tools and often make very little use of strategic or business planning (Woods & Joyce 2003; Jennings & Beaver 1995; Ambo-Rao & Pendse 1985; Welsh & White 1981; Mitzberg 1979).

Matlay (1999) noted that owner-managers made little use of formal decision making tools. In fact, 91.53% of micro-business (less than 10 employees) and 68.05% of small businesses (fewer than 50 employees) described their management style as informal. Woods and Joyce (2003) and Smith et al. (1988) concluded that owner-managers are more informal in their management style compared to large businesses.

Other studies have examined the use of management tools used in the decision making and planning processes of SMEs to confirm an informal decision making and management approach. Woods and Joyce (2003) and Stonehouse and Pemberton (2002) determined that owner-managers made less use of strategic and traditional management tools. Lyles et al. (1996) and Matthews and Scott (1995) determined that small businesses suffered from a lack of sophistication in their approach to strategic management and thinking. O'Gorman and Doran (1999) and Stonehouse and Pemberton (2002) concluded that SMEs rarely engage in proper planning and often use strategic activities, such as the formation of mission statements, incorrectly or not at all.

Furthermore, many small and medium-sized businesses make less use of other traditional decision making procedures (Delisle & St-Pierre 2004). For example, Kotler, Armstrong and Cunningham (2005) and Hisrich et al. (2006) both point out that SMEs make little use of marketing information systems, especially market research, when compared to larger enterprises. Raymond, Brisoux and

Abdellah (2001) found in their study on marketing information systems in Canada that 40% of SMEs occasionally collect and process marketing information and 20% have formal procedures to disseminate this information within the firm. Since market research is crucial in making decisions and planning strategy, in its absence many owner-managers are left to use intuition or feedback from family and friends in making crucial decisions (Hisrich et al. 2006).

It has also been found that SMEs lack knowledge and practice of benchmarking/ performance measures when making decisions. Cassell (2001) found that there is a lack of benchmarking in SMEs coupled with an actual lack of interest in the subject matter. Cassell's findings support earlier work completed by Monkhouse (1995) who concluded that SMEs do not engage in benchmarking in any significant fashion. Hudson, Lean and Smart (2001) verify the author's findings with one exception – that financial benchmarking is common in SMEs. However, it was categorized as ineffective in supporting the goals of the organization. Other studies have found that SMEs rarely use performance measures and when they do they are often used incorrectly (Veitch & Smith 2000; Husdon et al. 1999, 2000; Barnes et al. 1998; CIMA 1993).

Additionally, McMahon and Holmes (1991) completed a literature review of financial management practices in North America and determined that the majority of small businesses make little use of formal techniques that are common in large businesses. The authors determined that there was very little financial analysis being conducted and that only 20 to 30% of SMEs were involved in budgeting. Peel and Bridge (1998) looked specifically at the use of capital budgeting in SME planning and decision making and concluded that the majority of firms make use of less sophisticated financial tools. Similar results were found in Cyprus where Lazaridis (2004) found that 11.39% of SMEs make use of recommended financial analysis techniques.

2.4.6 SMEs Focus on Short Term Planning

Stonehouse and Pemberton (2002) surveyed 159 SMEs in England and found that 70% of organizations plan for the short term only (three years or less) and 20% of firms do not plan beyond the current year. The authors also discovered that the majority of organizations focus on short term sales and profits rather than long term goals. Lyles et al. (1993) drew similar conclusions when they looked at the planning activities of 188 SMEs in the United States. Additionally, Carroll, Marchington and Earnshaw (1999) found that small firms think more in terms of short term profits compared to long term gains and are more than likely unwilling to trade short term benefits for long term results. SMEs are also unwilling to invest either time or money into training that does not have a quick payoff (Handy et al. 1988). Other researchers including Mathews and Scott (1995), Lyles et al. (1993), Robinson, Logan and Salem (1986), Welsh and White (1981), and Mintzberg (1979) reported similar short term management strategies in their research.

2.4.7 Lack of Planning

As noted above, decision makers often rely on intuition when making decisions and focus on the short-term. This may be explained by the lack of business or strategic planning in SMEs. Lyles et al. (1993) found that a firm's decision making process is related to the formality of its planning. Robinson and Pearce (1984) reviewed over 50 studies on SMEs' planning activities and concluded that very little formal planning occurred in SMEs. Furthermore, the authors stated that of the little planning that occurred, most of it was not documented, unstructured and not comprehensive. In a longitudinal study carried out from 1981 to 1983, Sexton and Van Auken (1985) confirmed the lack of planning and characterized the planning that did occur as poor. Robinson co-authored a follow-up study in 1986 and found that only 15% of grocers practiced any type of strategic planning (Robinson, Logan & Salem 1986). However, they reported that their sample (65%) engaged in short term planning. This finding supports the notion discussed above, that SMEs are more concerned with short-term time horizons.

Since the two Robinson studies, research has indicated that very little has changed in the way of SMEs planning activities. In an Australian study consisting of 3554 firms, it was found that in any year from 1995 to 1997, over 60% of small businesses failed to conduct any business planning and 49.13% of firms undertook no business planning over the three-year time frame. Of the firms that engaged in business planning, many did so in only one of the three years studied (Gibson & Cassar 2002). Similar results were found in the United States where Perry (2001) and Lyles et al. (1993) found that 62.5% and 62% of firms were not formal planners. Stonehouse and Pemberton (2002) found that while 92% of SMEs in England self-reported being engaged in strategic planning, most firms do not in fact participate in strategic planning.

The lack of planning is also found in family businesses. A national United States study found that only 37% of family owned businesses had a strategic plan (2001 American Family Business Survey). This overall lack of planning by SMEs is supported in numerous other studies, including, but not limited to, Robison and Pearce (1983), Peel and Bridge (1998), and Woods and Joyce (2003).

It should be noted that not all studies point to lack of planning or sophistication in planning by SMEs. Rue and Ibrahim (1998) determined that SMEs engage in more planning than previously thought, finding that over 60% of firms could be classified as Moderated Sophisticated Planners or Sophisticated Planners. However, when one looks closley at their findings, their conclusions may not point to a significant difference in SME planning activities. While Rue and Ibrahim found that 60% of SMEs were engaged in planning, their respondents had a relationship with the Georgia State University Business Development Centre which means they were exposed to business planning, consulting and/or seminars. Thus one can surmise that their planning activities were at least related to being exposed to planning stimuli. Furthermore, their findings are not longitudinal and as previously stated planning in one year does not guarantee firms will plan in future years (Gibson & Cassar 2002).

Some exceptions can be found, as larger SMEs and firms that can be described as fast-growing or entrepreneurial have exhibited a tendency to plan more. In a survey of 65 fast growth family businesses, Upton, Teal and Felan (2001) found that 71% of the firms had formal written plans with 50% spanning over three years. While the sample group did not include limitation for size as defined by the number of employees, the mean number of employees for the firms surveyed was 101, and the median was 75, suggesting that the firms could be categorized as SMEs. Matthews and Scott (1995) compared the planning activities of 94 small businesses (non-growth), compared to 36 entrepreneurial firms (growth focus). They concluded that the entrepreneurial firms completed more strategic planning than small business and those small firms focused on short term operational plans. Gibbons and O'Connor (2005) came to similar conclusions that growth firms do engage in more planning.

In summary, SMEs are usually managed by the founding owner. The owner adopts a centralized system of management where he or she makes the majority of strategic and operational decisions usually by applying intuition and ignoring such traditional management tactics as planning, market research, and establishing performance measures. It is important to note that as SMEs grow in size, they are more prone to engage in more traditional management activities such as planning or establishing boards, but they often do not abandon their highly centralized system of decision making. The next section will explore SMEs' human resource and financial management practices.

2.4.8 Human Resource Management

SMEs' human resource management practices are also quite unique as they are neither formal nor systematic (Heneman, Tansky & Camp 2000; Carroll, Marchington & Earnshaw 1999; McEvoy 1984). SMEs' owner-managers state that recruiting, motivating and retaining employees is one of the largest challenges they have to overcome (Golhar & Deshpande 1997; Mathis & Jackson 1991; Hornsby & Kuratko 1990). Some examples of the unique human resource features of SMEs are that they employ generalists not specialists (Wager 1998; Cragg & King 1993), have a higher turnover rate of employees (McEvoy 1984), provide less compensation in the form of salary and/or benefits (Atkinson & Storey 1994; Morissette 1993; Amba-Rao & Pendse 1985; McEvoy 1984), employ an informal hiring process that is characterized by a lack of planning and formal selection methods (Heneman, Tansky & Camp 2000; Thong 1999), and have difficulty in attracting qualified employees (Bourgeois 2006a, 2006b, 2006c, 2006d, Atkinson & Storey 1994). The result of these unique features is that the composition of SME's human resources is quite different from that of larger businesses.

2.4.9 Financing

The structure, availability and sources of SME financing are other unique features of small and medium-sized businesses. SME capital structure is heavily reliant on debt for financing, particularly bank debt, which is often guaranteed by assets of the business and/or personal assets of the owner-manager. Equity is often only a small percentage of SMEs' capital structure and the majority of equity comes

from the owner-manager or in the form of retained earnings. SMEs, especially newer and smaller firms, often have difficulty attracting external financing – much of SME financing is classified as short-term, and owners of SMEs tend to believe that lack of financing restricts growth and investment (Singer & Svejnar 2000; Berger & Udell 1998; Elgin, Licht & Steil 1997; Hughes 1997; Binks & Ennew 1996; Cromie 2000; Pissarides, Welsh & White 1981).

2.4.10 Capital Structure

The capital structure of SMEs is unique in that it is heavily reliant on debt as the main source of financing and most of the equity financing usually comes from the owner-operator. In a 2003 study of Canadian Small and Medium-Sized Business Financing, it was determined that debt makes up 70% of SME financing while equity constitutes the other 30%. Of the 30% that is equity, the owner-manager contributed 86% of the amount, making him by far the largest shareholder. Research in the United States (Scott, Dunkelberg & Dennis 2003), and the United Kingdom (Berger & Udell 1998; Hughes 1997) reported similar results.

The primary debt source for SMEs is bank financing or, more specifically, short-term bank financing, followed by trade credit. Studies found that banks supply 50-60% of SME financing in the United Kingdom (Hughes 1997; Cosh, Duncan & Hughes 1996); 60-70% in Canada (Small and Medium-Sized Enterprise Financing in Canada 2003; St-Pierre, Beaudoin & Desmarais 2002), and approximately 40% in the United States (Scott, Dunkelberg & Dennis 2003). Unlike large business, this debt is usually personally guaranteed by the owner and/or secured by business assets (Small and Medium-Sized Enterprise Financing in Canada 2003; Berger & Udell 1998).

SMEs' owners contribute the majority of equity into their firms, either as a direct cash investment or as retained earnings. As noted above, investment by the owner-manager is the main source of equity financing in the United Kingdom, the United States, and Canada. This is also the case in Russia and Bulgaria (Hisrich et al. 2006; Scott, Dunkelberg & Dennis 2003; Small and Medium-Sized Enterprise Financing in Canada 2003; St-Pierre, Beaudoin & Desmarais 2002; Pissarides, Singer & Svejnar 2000; Berger & Udell 1998; Hughes 1997).

2.4.11 Lack of Financing Limits Growth and Investment

Since financing is essential to investing in capital expenditures or growth, the lack of external financing or the perception of the lack of financing limits growth and investment (Survey of Small and Medium-Sized Enterprises in Canada 2003; Pissarides, Singer & Svejna 2000). Binks and Ennew (1996), using evidence from a survey of over 6000 firms found that firms, especially those that are planning to grow, perceive a lack of credit as a constraint. Various other researchers have noted that SMEs either lack the capital to grow or perceive that there is not external capital available and do not attempt to raise funds (Survey of Small and Medium-Sized Enterprises in Canada 2003; St-Pierre, Beaudoin & Desmarais 2002; Elgin, Licht & Steil 1997; Binks & Ennew 1996). Some researchers questions whether the shortage of financing is more of a perception than it is a reality (Scott, Dunkelberg & Dennis 2003; Hughes 1997), but if SMEs

fail to seek external funding due to a perception, then this perception is limiting investment and growth.

In summary, the majority of SMEs are dependent on the owner to financially support the business by either personally guaranteeing debt or by investing in the firm. SMEs also suffer from a lack of capital to pursue growth or investment opportunities.

2.4.12 External Pressures and the Nature of SMEs

SMEs are also affected by a number of external factors that influence how they conduct business. Due to their size and financial position, SMEs have less control over their external environment than larger companies and face more risks as a result (Hill & Stewart 2000; Westhead & Storey 1996; Gavin 1992). As a result, SMEs are more prone to be hurt by economic downturns (Hughes 1997). Studies in Canada (Baldwin et al. 2000) and Australia (Everett & Watson 1998) concluded that a high percent of firm failures can be attributed to external shocks in the economy. These results confirmed earlier research by Peterson, Kozmetsky & Ridgway (1983) and by Birley and Niktari (1995).

The findings that SMEs are more susceptible to shocks in the economy illustrates the risky nature of SMEs. SMEs are characterized by high turnover and high death rates (Baldwin et al. 2000; DeLone 1988; Cochran 1981; Brigham & Smith 1967). In Canada, it has been found that 50% of small firms (less than 99 employees) are no longer operating by year five and that 80% of new companies have disappeared in 10 years (Baldwin et al. 2000). Berger and Udell (1998) and Harrison and Mason (1987) came to similar conclusions in the United States and the United Kingdom. The very nature of SMEs as more risky ventures makes them unique business units (Baldwin et al. 2000).

Many SME owners, unlike their large business counterparts, do not aspire to grow their business (Hisirich et al. 2007). The majority of SMEs will remain small or micro businesses (Baldwin et al. 2000; Storey 1994) thus their managing and marketing activities will differ from larger counterparts.

2.4.13 Summary of the Unique Characteristics of SMEs and their potential impact on adoption of e-commerce

This section on SMEs illustrates that they are in fact very different from large business. Hence, they will approach decisions such as the adoption of technology or e-commerce much differently than their larger counterparts. The review of the literature clearly indicates that the owners of SMEs are the dominant people within their firms. This dominance is evident in the highly centralized decision making process, the control the owners exert in managing the firm, and in their financial contributions and commitments. Furthermore, SMEs, unlike large businesses, often make decisions without the use of business planning or strategic management tools, lack the ability to attract and retain specialists and are more risky. It is evident from the research on SMEs that the owner or lone manager will play a key role in any decision regarding the adoption of technology, that the decision may be made without the lack of formal business techniques, and that the

lack of specialists and financing available may impact the decision. Since it has been established that SMEs are very different from larger businesses, the next section will discuss IT adoption in SMEs. The review of the literature will focus on facilitators of adoption, as this is central to addressing the main research question.

2.5 Adoption of IT by SMEs

After providing an overview of adoption literature as it pertains to organizations, followed by a discussion of the significant differences between SMEs and larger organizations and how these differences impact IT adoption, this review will proceed to examine IT adoption as it pertains to SMEs. This section will begin with a discussion on the state of research in this area, will note some limitations associated with the body of research, and will conclude with a discussion on drivers of IT adoption and the extent of IT use in SMEs.

2.5.1 Current state of the research

The current state of research on IT adoption by SMEs and the extent of the adoption can be described as disjointed. Authors appear to randomly select constructs from different 'intention' models or indiscriminately select drivers from other research in an attempt to explain the adoption or extent of IT in SMEs. This assertion is supported by the research conducted by Harrison, Mykytyn and Riemenschneider (1997) who concluded that the state of IT research on SMEs is fragmented in terms of findings and conceptual approaches. In a meta-analysis of research on IT and SMEs, Premkumar (2003) supported Harrison, Mykytyn and Riemenschneider's conclusions while noting that there are very few studies that actually address the adoption of IT by SMEs. Premkumar states, '*a casual observation of the research indicates that the studies are widely divergent and not comprehensive enough to create a cumulative research tradition'* (p. . 98). Prior to engaging in a review of the research in this area, the dissertation will examine some of the shared limitations of the studies to date.

2.5.2 Limitations of the Research

As noted above, one of the main limitations of the research that examines the adoption of IT by SMEs and/or the extent of use of IT from an organizational level is the small number of studies completed to date. Premkumar (2003) only found 15 articles in his meta-analysis of published articles from 1993 to 2003 in leading management information system journals (MIS) that deal with the adoption of IT and the extent of IT use in SMEs. Upon further analysis of Premkumar's work, the number of articles would actually decline, as some of the articles (Igbaria et al. 1997; Palvia et al. 1994) deal with the actual adoption and use of technology from an employee perspective, not from a firm's standpoint. Thong (1999) echoed Premkumar's comments when he noted that there is a lack of research that deals with the adoption of IT by SMEs. It should be noted that while Premkumar limited his findings to 'leading' MIS journals, this review widened the scope of the search for articles and found additional publications on the subject matter over a much wider time frame. The quantity (see Table 2.4), however, is not substantial compared to

other areas of IT research, such as the adoption of IT by large companies or the adoption of IT by a firm's employees (Venkatesh et al. 2003).

In addition to the limited quantity of studies on the subject, there is a lack of research that discusses and compares different models/theories. In fact, of the studies examined, only Plouffe, Hulland and Vandenbosch (2001) engaged in a comparison between models (TAM vs. PCI), and their study was not specifically aimed at SMEs. Their study is relevant to this research as the majority of participants were most likely SMEs, based on their country of origin (Canada) and their sector (retail). Furthermore, many of the researchers who have based their study(s) on a previously developed model do not acknowledge that competing models exist (Premkumar 2003; Stroeken 2001; Thong 1999) and engage in a limited discussion of the existence of other models (Winston & Dologite 2002; Plouffe, Hulland & Vandenbosch 2001).

What is more, it is often difficult to compare and generalize research because of the different definitions of SMEs (Fink 1998). As illustrated in Table 2.4 and previously discussed in the Definition section of Chapter 1 (Section 1.6), researchers use a variety of definitions for the term ranging from the number of employees (Alpar & Reeves 1990) to definitions that take into consideration the number of employees along with such business characteristics as sales and assets (Thong 1999). The matter becomes more complicated as there are no set 'number of employees' to use in defining a small business and researchers frequently establish different minimums and maximums.

Another limitation is that the majority of studies are asking respondents to reply to questions about their intentions after they have decided whether to adopt or not adopt the technology, as seen in the research conducted by Abdullah (2002), Chau and Hui (2001), and Thong (1999). Harrison, Mykytyn and Riemenschneider (1997) noted that retrospectively asking about intentions is not ideal and may skew results. They stated that intention is a future-orientated construct, and for firms that already adopted IT or made a decision not to adopt, questions about intention would have little meaning. In addition, some IT researchers have questioned if retrospective questions produce accurate responses, as individuals may in fact be expressing how they feel when the question is asked rather than how they felt at the time of their decision (Venkatesh et al. 2003). Further criticism of retrospective questions comes from Tornatzky and Klien (1982) who stated that adopters of an innovation would most likely rate the innovation as favourable, regardless of the innovation's performance. They concluded that most retrospective studies would result in a distorted view of prediction.

Additionally, the high number of case-based studies and surveys with small samples also limits the research (Premkumar 2003). While case studies allow for hypothesis generation and often allow for a rich description of the issues being studied, the norm in research is for theory development to progress to hypothesis testing, generalization, and replication (Chwelos, Benbasat & Dexter 2001). The number of participants in most of the research does not allow for multivariate analytical techniques, which impedes the ability of researchers to generalize their findings. Also case studies often present an optimistic view of IT in SMEs compared to survey research (Sancosus 1995; Yetton, Johnston & Craig 1994).

Furthermore, the majority of respondents in the research reviewed were the SMEs' owners. While this may be acceptable as researchers have concluded that the owners are often the only decision makers (Matlay 1999; Cromie 1989; Mintzberg 1979), this is not always the case (Thong 1999). The use of the owner as the main respondent becomes more suitable when the researcher(s) ask about the extent of the owner's influence on IT decisions, as seen in Harrison, Mykytyn and Riemenschneider (1997) and Thong (1999). Much of the research to date fails to address this issue. Other problems exist with only interviewing or surveying a single owner, including the possibility of self justification (Chau & Hui 2001) and the potential of inflated correlations due to common methods variance (Ajzen 1991). These general limitations that impact much of the research to date should be taken into consideration when the facilitators of IT adoption and the sophistication of IT use in SMEs are discussed.

2.5.3 Drivers of IT Adoption and/or the Sophistication of IT adoption

The following section will discuss drivers of IT adoption and factors that facilitate the sophistication or the extent of IT use in firms. For convenience, the research is first summarized in Table 2.3 and then the major drivers are illustrated in Table 2.4. It should be noted that under the header 'dependent' variable, the table will either categorize research as being an 'adoption' article, meaning the research focused on identifying facilitators of adoption, or an 'extent' article, meaning the researcher(s) were examining factors that facilitated the intensity of IT in a firm. Extent and sophistication are used interchangeably to define adoption decisions where firms are adding to an existing IT base and the adoption decision involves more than one type of technology. Some articles will be categorized as both adoption and extent articles/publications, since many researchers dealt with both questions. Essentially, researchers in this group asked current adopters to retrospectively answer questions about initial adoption and then asked questions about the extent of adoption, while non-adopters were asked questions about future adoption. It should be noted that articles were only categorized singularly as adoption articles when the research was measuring initial IT adoption. If a firm was already using IT and was adding software and/or hardware, the article would be considered both an adoption and an extent article.

Upon reviewing the research, it should be noted that there were a number of dependent variables used by researchers that have been classified in the table as 'extent.' This includes dependent variables, such as the successful use of IT (Calderia & Ward 2002) and IT growth (Cragg & King 1993). When this research was examined one of the most common measures of 'success' was the quantity of IT software and hardware used and the extent or sophistication of its use. Thus it is appropriate in labeling these articles as 'extent'. Furthermore, Beck, Wigand and König (2005) noted that successful IT adoption is directly related to the number of applications, illustrating that the terms success and extent are in fact related. Furthermore, the heading 'IT' is supposed to refer to the specific IT examined in the research, but in many papers the author(s) examined a wide variety of IT, including both software and hardware. Thus the table uses the term 'Multiple IT' to illustrate that the authors were examining adoption/extent of various types of software and/or hardware.

Table 2.3: Facilitators of IT in SMEs

Author	Participants n = size of SME	Proposed Model and/or basis for the research Note – if none are listed it was due to lack of information or specifics	IT	Depen-dent Variable	Data Collection Method	Analysis	Findings including the facilitators/ drivers of IT adoption and/or extent are:
Abdullah 2002	414 Malaysian SMEs n < 200		Multiple IT – An assortment of IT was used to measure for knowledge including: operating systems, software such as Microsoft Office, Lotus Applications, Multi-Media Systems, Webpage usage	Extent & Adoption	Survey	Multiple Regression	Facilitators of adoption/extent are: 1. Innovativeness of Entrepreneur 2. IT knowledge of entrepreneur 3. Education level 4. Size of the firm – larger more likely to adopt 5. Employees knowledge
Alpar & Reeves 1990	494 US SMEs n <500 high technology firms	Proposed that the following variables predict adoption: 1. Number of employees 2. Dollar sales in millions 3. Investment level in millions 4. Firms age months 5. Electronic Data Processing expenses in millions 6. Electronic Data Processing as a % of sales 7. Application areas 8. In-house software development in % 9. Years of computer use Variables are loosely based on the work by Gaither (1975) and Raymond and Magnenat-Thalmann (1982).	MS/OR applications which is software that can store information electronically and calculate models	Adoption & Extent	Survey	Logistic Regression	Facilitators of adoption/extent are: 1. Firm size (number of employees) 2. Extent of the firms compute use 3. The ability of firm's employees to develop, modify and maintain software (Employee's knowledge)

Author	Participants n = size of SME	Proposed Model and/or basis for the research Note – if none are listed it was due to lack of information or specifics	IT	Depen-dent Variable	Data Collection Method	Analysis	Findings including the facilitators/ drivers of IT adoption and/or extent are:
Caldeira & Ward 2002	12 Portuguese manufacturing SMEs n <500 Turnover less than 2.4 b^ESC; not more that 50% owned by a large business.		Multiple IT	Adoption & Extent	Case Study	Content Analysis	Facilitators: Top management perspective and attitude towards IS/IT adoption Barriers: Employee IT skill is a limit/barrier
Chau & Hui 2001	627 Hong Kong SMEs n <100 of which 36% are adopters	Proposed that the following influence EDI adoption and use: Characteristics of EDI Innovation – Perceived Direct and Indirect Benefits (Rogers 1983; Tontatzky & Klein 1982) External influence – Government and Business (Hart & Saunders 1997; Iacovou, Benbasat & Dexter 1995; Neo, Khoo & Ang 1994) Organizational Readiness – Prior EDI experience, Perceived support from vendor, perceived costs (Igbaria et al. 1997; Thong, Yap & Raman 1996; Iacovou, Benbasat & Dexter 1995; Yap, Thong & Raman 1994)	EDI	Adoption & Extent	Survey	Logistic Regression	Support for the model Facilitators: 1. Prior EDI experience (most significant) 2. Perceived support from the vendor 3. Perceived Direct Benefits Barriers: 1. Costs 2. Business partner influence
Chen & Williams 1998	8 British SMEs n < 250		Computers	Adoption & Extent	Case Study	Not clearly stated	Drivers: 1. Organizational culture – especially the characteristics of the owner-manager 2. Positive attitude towards IT 3. Perceived Advantages

Author	Participants n = size of SME	Proposed Model and/or basis for the research Note – if none are listed it was due to lack of information or specifics	IT	Depen-dent Variable	Data Collection Method	Analysis	Findings including the facilitators/ drivers of IT adoption and/or extent are:
Chen & Williams 1993	Stage I - 67 British SMEs n < 50 Stage II – 10 companies were interviewed consisting of 5 adopters and 5 non-adopters		Computers	Adoption & Extent	Survey & Interview	%ages	Barriers: 1. Size 2. Belief that computers would mot be useful
Chwelos, Benbasat & Dexter 2001	317 Canadian purchasing managers Note: Study did not target SMEs but authors did conclude that the participants in the reflected the characteristics of SMEs with fewer than 500 employees	Replicated the model proposed by Iacovou, Benbasat and Dexter (1995).	EDI	Adoption & Extent	Survey	Partial Least Squares Regression	Support for the model Facilitators of adoption/extent: 1. Readiness – IT sophistication and financial resources 2. Perceived Benefits 3. External Pressure – competitive pressure, industrial pressure, dependency on trading partner
Cragg & King 1993	27 SMEs n < 50 Also a case study with 6 SMEs	Nolan's Growth Process (1979) and DOI (Rogers 1983).	Software applications	Adoption & Extent	Survey/Case Study	Cross Case Analysis	Facilitators of adoption/extent: 1. Managerial Enthusiasm 2. Relative Advantage 3. Consultant Support Barriers: 1. Lack of resources (financial and human) 2. Limited Education
DeLone 1988	93 manufacturing SMEs n < 300 and $30 million in sales		Multiple IT	Extent	Survey	Multivariate cross-classifi-cation	Facilitators of extent: 1. CEO knowledge of computers 2. CEO involvement in computerization

Author	Participants n = size of SME	Proposed Model and/or basis for the research Note – if none are listed it was due to lack of information or specifics	IT	Depen-dent Variable	Data Collection Method	Analysis	Findings including the facilitators/ drivers of IT adoption and/or extent are:
Fink 1998	93 Australian SMEs n = 10 – 500	Identified the following variables based on the work of Thong, Yap, Raman (1996), Iacovou, Benbasat and Dexter, (1995) and Cragg and King (1993): 1. Internal Resources 2. Benefits of IT 3. Outside Support 4. External Resources 5. External Environment 6. In-house IT expertise 7. Organizational Culture 8. Availability of IT 9. IT Selection 10. IT Implementation	Input, processing and output of date and information within an organization	Adoption & Extent	Survey	Cluster Analysis	Facilitators of adoption/extent: 1. IT benefits – operational and managerial IT available 2. Organizational Culture - attitude 3. In-house IT expertise – employee and management knowledge 4. Internal Resources – top management support
Harrison, Mykytyn & Riemen-schneid-er 1997	162 SMEs	TPB (Ajzen 1991) which states that attitude, subjective norm and perceived behavioural control (PBC) predict future behaviour.	Multiple IT	Adoption	Survey	Multiple Regression	Support for the model Facilitators of adoption: 1. Attitude 2. Subjective Norm 3. PBC
Iacovou, Benbasat & Dexter 1995	7 Canadian SMEs n < 200	Proposed that the following influences EDI adoption/extent: Perceived Benefits (Rogers 1983) Organizational readiness (Cragg & King 1993; Swatman & Swatman 1991) External Pressure (Swatman & Swatman; Hart & Saunders 1994; Bouchard 1993)	EDI	Adoption & Extent	Case Study	Not clearly stated	Support for the model Facilitators of adoption/extent: 1. Organizational readiness - the availability of needed organizational resources for adoption (financing and employee's with IT knowledge) 2. External Pressure – trading partners and competitors 3. Perceived Benefits

Author	Participants n = size of SME	Proposed Model and/or basis for the research Note – if none are listed it was due to lack of information or specifics	IT	Depen-dent Variable	Data Collection Method	Analysis	Findings including the facilitators/ drivers of IT adoption and/or extent are:
Igbaria et al. 1997	358 New Zealand SMEs n = 20 – 100 firms must be independent Note: Study addressed employee adoption not organizational adoption.	TAM (Davis 1989) which states that perceived benefits (PU) and perceived ease of use (PEOU) explain behavioural intentions. TAM was extended test for inter and extra organizational factors that influence acceptance indirectly by influencing PU and PEOU.	Multiple IT	Adoption & Extent by employees	Survey	Partial Least Squares Regression	Support for the model Facilitators of adoption/extent: 1. PU 2. PEOU 3. Exogenous factors that influence usage by influencing PU/PEOU are management support and external support
Jantan, Ramayah & Chin 2001	69 Malaysian SMEs n < 151 Note: Study addressed employee adoption not organizational adoption.	Replicated study by Igbaria et al. (1997) in Malaysia. Igbaria et al. based on TAM (Davis 1989).	Multiple IT	Adoption & Extent by employees	Survey	Multiple Regression	Support for the model Facilitators of adoption/extent are: 1. Perceived Usefulness 2. PEOU 3. Management support indirectly through PU and PEOU 4. Outside support indirectly through PEOU
Julien & Ray-mond 1994	79 Canadian service and retail SMEs	Proposed that the following influence new technology adoption: Structure (Ford & Slocam 1987; Miller 1987) Organization (Raymond, Pare & Bergeron 1993; Miller et al. 1991; Dewar & Dutton 1986) Strategy (Venkatraman 1989)	Multiple IT	Adoption & Extent	Interviews	Stepwise Regression and Discriminate Analysis	Facilitators of adoption/extent are: 1. Sector 2. Status 3. Decentralization 4. Bureaucratization 5. Strategic Proactiveness 6. Time-Frame

Author	Participants n = size of SME	Proposed Model and/or basis for the research Note – if none are listed it was due to lack of information or specifics	IT	Depen-dent Variable	Data Collection Method	Analysis	Findings including the facilitators/ drivers of IT adoption and/or extent are:
Khazan-chi 2005	86 US EDI cable SMEs n < 500	Roughly based on Cragg and King (1993), Chen and Williams (1998), Senn (1992), Abdullah (2002), Julien and Raymond (1994), Seyal, Rahim and Rahman (2000), and Thong, Yap and Raman (1996).	EDI	Adoption & Extent	Survey	Step wise regression & factor analysis	Facilitators of adoption/extent: 1. Internal/external business and technological variables. If EDI is increasing in use (industry) and firm has the capabilities, then the firm is a good fit. 2. Organizational readiness and trading partner support. Does the firm have financials in place and support from trading partners. 3. Potential for positive financial impact 4. Potential for workflow productivity improvements.
Lee & Runge 2001							
Lefebrve, Mason & Lefebvre 1997	Canadian manufacturing SMEs n < 200	Proposed that the following influence technology policy which influences the adoption/extent of IT: 1. CEO's perception of the environment (Prescott 1986 2. The strategic business orientation including scanning and structural characteristics 3. Technology policy 4. Realized innovative efforts of the firm 5. Measures of form performance	Multiple IT	Adoption & Extent	Interview	Hierarchical regression	Facilitators of adoption/extent: CEOs perception of the external environment
Lin & Wu 2004	195 Taiwan SMEs n < 200 capital 1-8 million NTDs Note: Study addressed employee adoption not organizational adoption.	Replicated study by Igbaria et al. (1997) in Taiwan. Igbaria et al. based on TAM (Davis 1989).	Multiple IT	Adoption & Extent by employees	Survey	Structural Equation modeling (LISREL)	Some support of the model. Facilitators of adoption/extent: 1. PEOU influenced PU which influenced systems usage 2. Management support influenced PU and PU influenced systems usage 3. PU

Author	Participants n = size of SME	Proposed Model and/or basis for the research Note – if none are listed it was due to lack of information or specifics	IT	Depen-dent Variable	Data Collection Method	Analysis	Findings including the facilitators/ drivers of IT adoption and/or extent are:
McGregor & Gomes 1999	20 New Zealand SMEs n < 100		Multiple Technology	Adoption	Case Study	Content Analysis	Facilitators of adoption: 1. Top management 2. External influences
Monta-zemi 1987	83 Canadian SMEs n < 250		Multiple Technology	Adoption & Extent	Interviews	%ages, Frequencies, Mean	Facilitators of adoption/extent: CEO literacy Barriers: 1. Lack of policies for the selection of IS 2. Lack of decision making tools (IT)
Nickell & Seado 1986	129 SMEs – companies n < 1500		Computers	Adoption & Extent	Survey	%ages & uses a Computer Attitude Scale	Facilitators of adoption/extent: 1. Size of the business as measured by number of employees 2. Owners that have taken a computer class have a more positive attitude towards computers 3. Among computer users – positive attitude
Plouffe, Hulland & Vanden-bosch 2001	172 Canadian retailers	Compared TAM (Davis 1989) to PCI (Moore & Benbasat 1991, 1994) IT – Smart cards for payment processing	Smart Card for payment processing	Adoption	Survey	Partial Least Squares Regression	Support for both models. Facilitators of adoption: 1. Relative Advantage 2. Compatibility 3. Image 4. Visibility 5. Trialability 6. Voluntariness 7. PU 8. PEOU
Prem-kumar 2003	Meta-analysis of IT research and SMEs						Meta Analyses finds the following variables as being common: 1. Environmental factors – supplier incentive and vendor support 2. Organizational – top management support and size 3. Technology – PU, PEOU 4. Individual – IS expertise Three most common are supplier incentives, top management support, IS expertise.

Author	Participants n = size of SME	Proposed Model and/or basis for the research Note – if none are listed it was due to lack of information or specifics	IT	Depen-dent Variable	Data Collection Method	Analysis	Findings including the facilitators/ drivers of IT adoption and/or extent are:
Proud-lock, Phelps & Gamble 1999	267 Professional (lawyers, dentists, vets, doctors) SMEs with the following characteristics: 1. n < 25 2. privately owned – not part of a larger organization. 3. owner-manager must be predominant with no outside control.	Proposed that the following influence IT: 1. Productivity 2. Quality of Work life 3. Responsiveness 4. Competitive Advantage	Multiple IT	Adoption & Extent	Survey	%ages	Facilitators of adoption/extent: 1. Size – larger firms use more IT 2. Vendor effectiveness 3. Level of IT planning 4. Level of IT training 5. Management support for IT Barriers: 1. Lack OF TIME 2. Lack of IT knowledge 3. Lack of financial resources 4. Perception that costs outweigh the benefits 5. Perception that IT would be of little use to the organization 6. Management perception as an unnecessary business tool. 7. Smaller firms feel that IT less effective
Ramayah et al. 2002	77 Malaysia SMEs defined as: <u>Small sized firms:</u> n < 50 full-time workers and an annual turnover lf less than RM 10 million. <u>Medium sized firms</u>: n = 50-150 full-time workers and an annual turnover in the range of RM 10 million to RM 25 million. Note: Study addressed employee adoption not organizational adoption.	TAM (Davis 1989) and sought to determine impact of key demographics of SME owner-mangers including age, gender, education level to see if they would explain the variance in use of IT	Multiple IT	Adoption & Extent by employees	Survey	Hierarchical Regression	Support for the model Facilitators of adoption/extent: Education – better educated equates to higher adoption and intensity of use

Author	Participants n = size of SME	Proposed Model and/or basis for the research Note – if none are listed it was due to lack of information or specifics	IT	Depen-dent Variable	Data Collection Method	Analysis	Findings including the facilitators/ drivers of IT adoption and/or extent are:
Seyal, Rahim & Rahman 2000	54 Bruneian SMEs n = 50 - 250		Multiple IT	Adoption & Extent	Survey	Multiple Regression	Facilitators of adoption/extent are: 1. Sales figures (Larger) 2. Type of business 3. CEO computer literacy and knowledge 4. CEOs involvement
Stroeken 2001	401 Dutch SMEs from the automobile, textile and machine building sectors.	IT Growth Model (Tan 1995; Nolan 1973). Place companies in linear growth model and look for bottlenecks.	Multiple IT	Adoption & Extent	Survey	Placement	Small enterprises often lack the knowledge about the benefits of IT adoption or cannot implement the IT successfully.
Thong 1999	166 SMEs in Singapore that satisfied two of the following three criteria: 1. n < 100 2. The fixed assets of the business should not exceed $7.2 million US. 3. The annual sales of the business should not exceed US$9 million.	Proposed a model based on the following constructs as facilitators of IS (dependent variable): 1. Decision Making Characteristics – Innovativeness & Knowledge 2. Organizational Characteristics (Rogers 1983) 3. Organizational Characteristics – Size 4. Environment Characteristics	Multiple IT	Adoption & Extent	Survey	Partial Least Squares Regression and Discrimin-ant Analysis	Facilitators of adoption : 1. CEO's innovativeness 2. CEO's IS knowledge 3. Relative Advantage 4. Compatibility 5. Complexity 6. Business Size 7. Employee IS Knowledge Facilitators of extent: 1. Business Size 2. Employee IS Knowledge 3. Information Intensity
Thong, Yap & Raman 1996	114 Singapore SMEs with two of the following three criteria: 1. n < 100 2. Fixed assets not exceeding US $7.2 million. 3. Annual sales not exceeding US $9 million.	Proposed that IS effectiveness (extent) is driven/explained by: 1. Top management support (Elam 1988; Yap 1989a, 1989b; Stoddard 1986; Yap et al. 1992). 2. External IS expertise in the form of consultant effectiveness (Senn & Gibson 1981; Yap 1992) and vendor support (Cragg & King 1993; Lees 1987; Wong 1986; Yap et al. 1992).	Multiple IT	Extent	Stage I – 114 Survey Stage II – 67 Interviews	Partial Least Squares Regression	Facilitators of extent: 1. External IS Expertise – consultants and vendors 2. Top management support

Author	Participants n = size of SME	Proposed Model and/or basis for the research Note – if none are listed it was due to lack of information or specifics	IT	Depen-dent Variable	Data Collection Method	Analysis	Findings including the facilitators/ drivers of IT adoption and/or extent are:
Winston & Dologite 2002	13 US SMEs	Based on Cragg and King (1993) and Malone (1985).	Multiple IT	Extent	Case Studies	Cross-case analysis	Facilitators of adoption/extent: Owners that had either a positive or negative attitude towards IT. Owners with a positive attitude often have a great deal of knowledge about IT, embrace the technology and invest resources into the implementation. Owners with a negative attitude offset this by consulting with others and employing a democratic leadership style. Owners with an uncertain attitude (neither negative or positive) resulted in poor implementation.

Table 2.4: Facilitators of adoption/extent of IT

Facilitator	Source	Total Times Cited (Count)
CEO/ Top Management Education	Abdullah 2002 Premkumar 2003	2
CEO/Top Management Knowledge/Literacy	Abdullah 2002 DeLone 1988 Kimberley and Evanisko 1981 Montazemi 1987 Seyal, Rahim and Rahman 2000 Stroeken 2001 Thong 1999	7
CEO/Top Management Enthusiasm	Cragg and King 1993	1
CEO/Top Management Innovativeness	Abdullah 2002 Thong 1999	2
CEO/Top Management Attitude	Caldeira and Ward 2002 DeLone 1988 Harrison, Mykytyn and Riemenschneider 1997 Igbaria et al. 1997 Jantan, Ramayah and Chin 2000 Jarvenpaa and Ives 1991 Winston and Dologite 2002 Yap et al. 1992	8
CEO/Top Management Support	Premkumar 2003 Proudlock, Phelps and Gamble 1999 Seyal, Rahim and Rahman 2000 Thong, Yap and Raman 1996	4
Compatibility	Plouffe, Hulland and Vandenbosch 2001 Premkumar 2003 Thong 1999	3
Competitive Advantage	Premkumar 2003	1
Complexity	Lin 1998 Thong 1999	2
Consultant support	Cragg and King 1993	1
Employee Knowledge	Abdullah 2002 Alpar and Reeves 1990 Fink 1998 Iacovou, Benbasat and Dexter 1995 Nikell and Seado 1986 Premkumar 2003 Thong 1999	7
External Pressure	Chwelos, Benbasat and Dexter 2001 Iacovou, Benbasat and Dexter 1995 Igbaria et al. 1997 Kimberley and Evanisko 1981 Lefebvre, Mason and Lefebvre 1997 Premkumar 2003	6
Facilitating conditions	Harrison, Mykytyn and Riemenschneider 1997	1
Firms computer use	Alpar and Reeves 1990	1
Image	Plouffe, Hulland and Vandenbosch 2001	1
Internal resources	Fink 1998	1
Organization readiness – resources present	Iacovou, Benbasat and Dexter 1995	1

Facilitator	Source	Total Times Cited (Count)
Organizational Culture	Fink 1998	1
PEOU	Igbaria et al. 1997 Jantan, Ramayah and Chin 2000 Lin and Wu 2004 Plouffe, Hulland and Vandenbosch 2001 Premkumar 2003 Ramayah et al. 2002	6
Perceived Benefits/Relative Advantage	Chau and Hui 2001 Chen and Williams 1998 Chwelos, Benbasat and Dexter 2001 Cragg and King 1993 Fink 1998 Iacovou, Benbasat and Dexter 1995 Igbaria et al. 1997 Khazanchi 2005 Knol and Stroeken 2001 Lin 1998 Lin and Wu 2004 Plouffe, Hulland and Vandenbosch 2001 Premkumar 2003 Ramayah et al. 2002 Thong 1999	15
Prior Experience	Chau and Hui 2001 Chwelos, Benbasat and Dexter 2001 Yap et al. 1992	3
Size	Abdullah 2002 Alpar and Reeves 1990 Chen and Williams 1998 Harrison, Mykytyn and Riemenschneider 1997 Kimberley and Evanisko 1981 Nikell and Seado 1986 Proudlock, Phelps and Gamble 1999 Thong 1999	8
Subjective Norm	Harrison, Mykytyn and Riemenschneider 1997	1
Triability	Plouffe, Hulland and Vandenbosch 2001	1
Vendor support (perceived)	Chau and Hui 2001 Proudlock, Phelps and Gamble 1999 Thong, Yap and Raman 1996 Yap et al. 1992	4
Visibility	Plouffe, Hulland and Vandenbosch 2001	1
Voluntarism	Plouffe, Hulland and Vandenbosch 2001	1

As illustrated in Tables 2.3 and 2.4, there are a variety of factors that have proven to be influential in facilitating IT adoption and use in firms. As illustrated in Table 2.4, factors relating to perceived future benefits (PU/relative advantage), management attitude, innovativeness, support and knowledge, ease of use (PEOU/complexity), employee knowledge, and size are the most common factors documented as influencing SMEs use of IT. These findings are supported by Premkumar's (2003) meta-analysis, which found that PU, PEOU, top management support, size of the firm, and employee knowledge are the main influencers of IT in SMEs. It should be noted that Premkumar's meta-analysis lacked any statistical testing that is common in other Meta-analysis studies including those completed by King and He (2006),

Sheppard, Hartwick and Warshaw (1988), and Tornatzky and Klein (1982). Furthermore, Premkumar's finding only dealt with a small number of existing publications. The following section will further discuss the main drivers of IT in SMEs and will extend the discussion to 'external environment,' and 'external IT expertise' as they are also common in IT research.

2.5.4 Top Management

The influence of top management, usually the owner, on the adoption and the intensity of IT used is commonly cited in research as a main facilitator. As illustrated above (Table 2.4), the owner's attitude, knowledge, and innovativeness are all important drivers of IT adoption. In a survey of 414 Malaysian SMEs, Abdullah (2002) found that the entrepreneur's innovativeness and IT knowledge are the two key factors in determining adoption and intensity of IT. He concluded that *'…. unless entrepreneurs have the interest and will to innovate, there is a limited chance that other personnel of the business will expedite the adoption of IT especially in SMEs'* (p. 61). As such, he concluded that it is crucial that entrepreneurs understand the benefits of IT and have some IT knowledge. Thong (1999) similarly concluded that the owner-manager plays a crucial role in the adoption of IT. He found that organizations that had innovative and knowledgeable CEOs/owners were more likely to adopt IT. Thong noted that an investment in IT often accompanies a significant investment of scarce resources (capital/human) and that only a SME with an innovative owner would be willing to adopt. In addition, he stated that CEOs that have knowledge and awareness of the benefits of IT are more willing to adopt the technology. Furthermore, other authors have noted that the owner's lack of knowledge about IT is a significant barrier to adoption. Stroeken (2001) conducted research on 410 Dutch SMEs and found that small firms lack the knowledge about the benefits that IT can bring to the business. Iacovou, Benbasat and Dexter (1995) looked at both IT adoption (EDI) and the integration (extent) of adoption in seven Canadian SMEs and concluded that non-adopters lack IT knowledge, which acts as a barrier to IT adoption. Other researchers have found support for the CEO's IT literacy as a driver for adoption and the subsequent extent of the adoption (Abdullah 2002; Stroeken 2001; Seyal, Rahim & Rahman 2000; Thong 1999; DeLone 1988; Kimberley & Evanisko 1981; Montazemi 1987).

Harrison, Mykytyn and Riemenschneider (1997) concluded that an owner's positive attitude towards IT was a key determinant of adoption. Other authors, such as Caldeira and Ward (2002), Winston and Douglite (2002), Chen and Williams (1998), and DeLone (1988), came to similar conclusions that the owner's positive attitude towards IT is a facilitator of adoption and intensity of IT use in SMEs. Findings by Winston and Dologite (2002) were somewhat contradictory to the other research. Most researchers found that when an owner had a positive attitude towards IT that they were more likely to adopt (Harrison, Mykytyn & Riemenschneider 1997) and make greater use of the technology (DeLone 1988), while owners with a negative attitude are less likely to adopt and will not adopt to a significant extent (Harrison, Mykytyn & Riemenschneider 1997). Winston and Dologite found that owners with a negative attitude are more likely to successfully adopt IT and have a higher intensity of adoption than previously expected. They noted that owners with a negative attitude were amenable to soliciting external support to guide them though the adoption process, resulting in successful IT adoption. It should be noted that these

findings are based on research that included only 13 participants and relied on cross-case analysis to support their conclusions.

Other researchers found that top management support is a facilitator of IT adoption and intensity. Thong, Yap and Raman (1996) reviewed both management and IT research literature and concluded that the role of top managers is usually filled by the owner and this is usually the person who decides if a firm should or should not adopt IT and the extent of the adoption. Their subsequent study of 114 SMEs supported their assertion that top management support is important in determining the adoption of IT and extent of its use. Other researchers such as Proudlock, Phelps and Gamble (1999) and Seyal, Rahim and Rahman (2000), came to similar conclusions that top management support is important as most managers are the owners who make the majority of decisions and allocate resources.

Thong's (1999) findings, in regards to the facilitators that influence the extent of SMEs' adoption contradicted much of the research (Abdullah 2002; DeLone 1988). Thong found that employee knowledge, information intensity, and size of the firm were the main factors that influenced the extent of IT in SMEs. He concluded that the characteristics of CEOs were not influential in explaining the extent of adoption. Thong explains this by noting that as firms use IT, employee's knowledge improves and they become more influential in determining the extent of use. In addition, larger firms and firms with greater information processing needs are more likely to have a higher intensity of IT adoption. A couple of factors not discussed by Thong may explain the lack of influence of the owner. First, the technology in his study was basic software including such things as inventory and accounting packages. He then measured extent by the number of computers and applications in use by the firm's employees. As the owner's initial adoption of the technology would be innovative, subsequent use of the software in particular may normally be left up to the employee and not seen as an innovation by the owner. Furthermore, the use of the technology by employees may not have occurred voluntarily leaving them little choice to improve their IT knowledge and use the technology.

Other researchers questioned the role of the owner-manager as a facilitator of IT. Harrison, Mykytyn and Riemenschneider (1997) applied TPB and other constructs, including characteristics of decision makers on SME's adoption of IT. They found support for their TPB and concluded that decision maker characteristics had no influence in the decision to adopt. One reason for this conclusion may be that their study did not look at either the decision maker's innovativeness or their computer literacy, which, as illustrated above, have received strong support in other studies.

2.5.5 Benefits

Another significant facilitator of IT in SMEs is the anticipation of future benefits. While the term used to describe 'future benefits' can differ, the majority of researchers adopt either TAM's perceived usefulness (PU) (Davis 1989) or Roger's (1983) relative advantage (RA) construct when discussing future benefits. Researchers have noted that the two constructs PU and RA are quite similar, as both measure perceived future gains (Venkatesh et al. 2003; Plouffe, Hulland & Vandenbosch 2001). Plouffe, Hulland and Vandenbosch (2001) researched the adoption of smart cards by 172 Canadian retail merchants, comparing TAM and PCI

and making use of PU and RA constructs. They determined that both constructs are strong facilitators of intentions to adopt IT and found support for both TAM and PCI, with the former explaining more variance in intentions to use the technology. While their study was not directly aimed at SMEs, it is worth noting as many of the businesses that responded would be classified as such, no single merchant employed more than 300 employees, and one third of merchants reported sales of less than $250,000. In addition, the description of the respondents noted large companies but also included small restaurants, music stores, and second hand clothing stores. Finally, their country of origin was Canada where upwards of 99% of companies are SMEs (Hisrich et al. 2005). In their survey of 162 SMEs, Harrison, Mykytyn and Reimenschneider (1997) concluded that owners adopt IT to help their firms compete and gain an advantage. Cragg and King (1993) found similar results in their case study research aimed at six engineering firms. They found that firms grew their use of IT (extent) when they anticipated some future benefit. Firms in their study noted that they hoped to become more efficient and competitive by adopting more IT. Other researchers such as Chwelos, Benbasat and Dexter (2001), found that perceived future benefit was the main driver of IT adoption and/or extent of adoption. Other researchers, who identified perceived benefits as a driver of IT adoption or extent of adoption include Chau and Hui (2001), Chen and Williams (1998, 1993), Chwelos, Benbasat and Dexter (2001), Fink (1998), Iacovou, Benbasat and Dexter (1995), Igbaria et al. (1997), Khazanchi (2005), Knol and Stroeken (2001), Lin and Wu (2004), Plouffe, Hulland and Vandenbosch (2001), Premkumar (2003), Ramayah et al. (2002), and Thong (1999).

2.5.6 Ease of Use

Another driver of IT in SMEs is the perceived ease of use of the IT. It should be noted that complexity and PEOU have been recognized as being closely related, as they both measure perceptions about the user friendliness of IT (Venkatesh et al. 2003). Among the research Thong (1999) found that ease of use was relevant to initial adoption but not important in explaining the extent of adoption. He notes that this most likely occurs because employees' IT knowledge improves after initial adoption and they are no longer concerned about increasing the intensity of IT. As previously stated, Thong's findings dealt with the adoption of what could be characterized as simple technology, and this may explain the decreased emphasis on PEOU. Igbaria et al. (1997) studied employee adoption of technology using TAM and other exogenous factors such as management support and external assistance. Their research found that PEOU influenced adoption both directly and indirectly by influencing perceived usefulness. Other researchers, most notably Jantan, Ramayah and Chin (2001) and Lin and Wu (2004) replicated the work carried out by Igbaria et al. in other countries and came to similar results. Some contradicting opinions exist when it comes to the role of PEOU and IT in SMEs. In their Canadian survey, Plouffe, Hulland and Vandenbosch (2001) found that neither PEOU nor complexity influenced the adoption of smart cards by retailers. However, they failed to address the question if PEOU indirectly influenced adoption through perceived usefulness (TAM) or relative advantage (PCI) which has been noted as occurring in other technology adoption literature (Venkatesh et al. 2003; Davis 1989).

2.5.7 Employee Knowledge

Employee knowledge is another frequently cited driver of IT in SMEs. Thong (1999) found support for employee knowledge as a facilitator of adoption and extent of IT. Thong stated that firms with more knowledgeable employees will be willing to adopt IT, and knowledgeable employees are most likely to use IT more extensively. Abdullah (2002) came to a similar conclusion that firms with knowledgeable employees are more likely to make use of IT. Other researchers (Premkumar 2003; Fink 1998; Iacovou, Benbasat & Dexter 1995; Alpar & Reeves 1990; Nickell & Seado 1986) came to similar conclusions about the importance of knowledgeable employees.

2.5.8 Size

Firm size, as measured by the number of employees, is another commonly discussed driver of IT adoption and use in SMEs. Generally speaking, it has been hypothesized by a number of researchers that the larger the firm, even among SMEs, the more likely that it will use IT (Abdullah 2002; Thong 1999; Harrison, Mykytyn & Reimenschneider 1997; Alpar & Reeves 1990). Thong (1999) found that size influenced both adoption and the extent of adoption. Thong writes that among SMEs, the larger businesses are more likely to have the resources needed to adopt IT and, furthermore, are those most likely to further their adoption (extent) based on their workload. Abdullah (2002) also found that larger Malaysian SMEs are more likely to adopt and use IT due to their ability to attract needed resources. In Alpar and Reeves' (1990) survey of 494 US SMEs and Proudlock, Phelps and Gamble's (1999) study of 267 professional US SMEs, 'firm size' was found to be the main driver of IT adoption and extent of adoption. However, there has been some contradictory evidence on the role that size plays in the adoption of IT. Harrison, Mykytyn and Reimenschneider (1997) found that size did not influence the adoption of IT by SMEs.

2.5.9 External Environment

There has been much discussion about the influence of competitors, suppliers, and customers on the adoption of IT. To date, much of this research has had mixed results. Iacovou, Benbasat and Dexter (1995) found that external pressure was the strongest driver of adoption and extent of adoption although there are several limitations with their study. Firstly, all of the respondents in the study were participants in an external plan trying to encourage them to adopt EDI by one of their main customers (Canadian government). Therefore, it is likely that respondents would feel this pressure more so than in previous or future years. This fact was mentioned by Chen and Williams (1998) who stated that Iocavou, Benbasat and Dexter (1995) were not studying EDI but the extension of control of large businesses on small firms. Chwelos, Benbasat and Dexter (2001) adopted and retested the Iocavou, Benbasat and Dexter model on medium to large-sized businesses and found that while external pressure is a significant factor in explaining adoption, it is not as significant as perceived benefits. It should be noted that EDI is a technology that is more likely to be associated with strong external pressure especially when one partner or potential partner is a SME, as the larger firms will be able to exercise some level of control on the smaller company. In his survey of 93 manufacturing firms, DeLone (1988) found that external support was not linked to computer success.

DeLone notes that this is most likely the case because the CEO understands the business the best and knows where computers are most likely to impact the business.

2.5.10 External IS Expertise

The influence of vendor support and the use of consultants as a facilitator of IT has also resulted in mixed findings. DeLone (1988) found that outside expertise was not helpful in facilitating IT. He stated that the owner/CEO was the key driver of IT in firms. Proudlock, Phelps and Gamble (1999) supported DeLone's conclusion, noting that the majority of SMEs felt that hiring external help was of little value to the firm. Thong, Yap and Raman (1996) found that while the CEO was important in making the initial adoption decision, external expertise becomes more important in the implementation state (extent). Their research notes that CEOs are too busy to involve themselves in the implementation of IT. However, their research suffers from several limitations that hinder their final conclusion. First, their sample size is small (114) and participants only come from one country, Singapore, which is recognized by the authors as having a unique culture and business climate. Second, their participants exhibited some characteristics of larger businesses. For example, the firms in the study recorded mean sales of $6 million US and all the participating companies had a manager who was in charge of IT in the firm. Since larger businesses have the resources to bring in external IT support and have different IT implementation patterns, their research should be replicated on a larger scale before it is generalized. Thong, Yap and Raman conclude that CEOs should not be involved in the implementation of IT and that it should be left to the external experts and IT managers. However, based on the lack of financial and human resources in small firms it is unlikely that most SMEs, especially smaller SMEs, will have the ability to hire external help or have the CEO delegate tasks to an IT manager.

2.5.11 Summary of Facilitators of IT adoption

Upon review of the research on the main drivers of IT adoption and the extent of adoption in SMEs, a number of facilitators have been proven to be particularly pertinent to the research. Most notable are the role of top management (owner), perceived benefits, ease of use, employee IT knowledge, and size of the business. While the research regarding external environments and external IT support are not as consistent or as conclusive as the factors above, the research indicates that the factors merit further investigation and consideration in the dissertation. It is now useful to review the research, specifically as it pertains to e-commerce adoption in SMEs, as this is the focal point of this research.

2.6 Adoption of e-commerce by SMEs

This section provides a detailed examination of e-commerce as it pertains to SMEs. The first part reviews the current state of the literature, including a discussion of limitations of the research to date. It defines e-commerce to further clarify and justify the definition adopted in this study, then discusses the nature of e-commerce to illustrate that it is a complex innovation and, as a result, one which may have a unique adoption process. This discussion of the nature of e-commerce will provide further evidence supporting the use of the previously discussed IT adoption research as an immediate discipline. Next, e-commerce and SMEs are discussed, specifically

the adoption patterns of SMEs, the benefits associated with adopting e-commerce, and the extent of adoption by SMEs, providing an overview of the current state of the field and further justification for the research.

The factors that influence the adoption of e-commerce by SMEs are then considered and put forward as building blocks toward a new theory. This section concludes with a discussion of the state of e-commerce as it pertains to Canada, specifically Atlantic Canada, using government and scholarly studies as points of reference. While Canadian studies are included in the previous sections, this discussion is important due to their focus on promoting e-commerce adoption in Canada, specifically Atlantic Canada.

2.6.1 Current State of the Research

Much like the previously discussed IT literature, the state of e-commerce research as it pertains to the adoption and use by SMEs can be described as fragmented. E-commerce researchers who study the adoption and the extent of adoption of Internet technologies by SMEs usually select a behavioural intention theoretical model to use as the base for their study or develop a list of drivers/facilitators or barriers that can explain adoption/extent. Researchers rarely compare models and/or facilitators and barriers in their studies and often do not mention them in their literature review or discussions. This lack of consistency in model building, the broad range of theoretical foundations and incomplete literature reviews has resulted in inconsistent research terms and definitions of variables that explain e-commerce adoption (Wymer & Regan 2005). Premkumar's (2003) description of IT/e-commerce research as *'widely divergent and not comprehensive enough to create a cumulative research tradition'* (p. 98) is applicable. Prior to reviewing the various facilitators and barriers to e-commerce, this dissertation will examine some of the shared limitations of the research to date.

2.6.2 Limitations of Existing Research

One of the limitations to date has been the lack of studies that deal with the adoption of e-commerce and the level of sophistication of that adoption by SMEs (Levenburg & Magal 2005; Wymer & Regan 2005). The research is further limited by its exploratory nature (Raymond, Bergeron & Blili 2005; Wymer & Regan 2005) and a lack of empirical studies (Premkumar 2003). While qualitative research provides rich data, it does not allow for multivariate statistics, which are necessary for researchers to generalize their findings (Chwelos, Benbasat & Dexter 2001). Sancosus (1995) and Yetton, Johnston and Craig (1994) have concluded that case study research provides an optimistic view of IT use in SMEs when compared to survey results.

Another limitation of existing research is the lack of comparisons between studies and consistent definitions of variables. Wymer and Regan (2005) acknowledge that the lack of comparisons cause confusion and can result in contradictory definitions of facilitators and barriers. *'This broad range of theoretical foundations, found in the literature, probably accounts, at least in part, for the confusing, and sometimes contradictory, collection of variables identified as incentives and barriers to e-commerce/e-business Internet technologies adoption and use'* (p. 439). In

completing a review of the literature for this research, only a small number of studies (Molla & Licker 2005; Grandon & Pearson 2004a,b; Grandon & Pearson 2003; Riemenschneider, McKinney & Mykytyn 2003; Riemenschneider & McKinney 2001–02; Mirchandani & Motwani 2001; Van Akkeren and Cavaye 1999) offered clear comparisons between theoretical models. Of the studies that identified drivers and barriers to adoption, very few discussed their relationship to variables evident in theoretical models.

Further evidence of this lack of clarity can be found in the various terms used to describe Internet technologies. As noted below in Section 2.6.3, researchers use a variety of terms to refer to Internet technologies, commonly using e-commerce, e-business, while other researchers have adopted the terms Internet Business Solutions (IBS) and Internet Communications Technologies (ICT). While these terms are often describing similar business activities, this is not always the case and the lack of a clear definition further complicates research. Some researchers limit the use of the term e-commerce to the buying and selling of goods online (Daniel & Wilson 2002), while others allow for a much broader application of the term to include almost all online activities (Looi 2005; MacGregor & Vrazalic 2004). Other authors use the term ICT to include activities such as faxes, which do not even rely on Internet technologies (Johnston, McClean & Wade 2004, III 2003). The lack of a consistent term to describe Internet technologies makes it difficult to compare findings.

Much like IT research, it is difficult to compare findings due to the various definitions of SMEs used (Fink 1998) and the different geographical locations of the firms being studied. As previously discussed in Chapter 1, Section 1.6.3, many different definitions of the term SME exist. Larger SMEs are often very different from smaller SMEs (Mintzberg 1979), and this can cause difficulty when trying to draw conclusions from the research. Drawing conclusions and making comparisons is further complicated by the diverse geographical locations of the firms in the studies. Most research focuses on a small region of a country and few researchers have compared results from one country to another. This lack of comparison between regions and countries has resulted in researchers often being hesitant to draw broad conclusions from their findings (Konstadakopulos 2006; Molla 2005).

Other problems include the retrospective nature of many of the adoption studies, which may result in respondents answering questions based on how they felt at the time of the questionnaire and not at the time of the adoption decisions (Harrison, Mykytyn & Riemenschneider 1997; Tornatzky & Klien 1982). The use of the owner-manger or CEO as the only respondent in many of the studies may be appropriate, as many SMEs operate with in a highly centralized fashion, with only one decision maker (Matlay 1999; Cromie 1989; Mintzberg 1979), evidence indicates that this is not always the case (Thong 1999), especially with larger SMEs (Matlay 1999). The use of one owner may result in self-justification (Chau & Hui 2001) and/or inflated correlations due to common methods variance (Ajzen 1991).

In summary, the research on e-commerce adoption by SMEs is fragmented, suffers from a lack of comparative research, provides inconsistent definitions of key terms, including variables/constructs and businesses studied (SMEs). The limitations of e-commerce literature are similar to those found in IT literature (Section 2.5.2). This section will review various definitions used for the terms e-commerce and e-business

and will then select one term and definition to be used in this dissertation. The identification of a term and the creation of a definition will aid in providing a clear context for the technologies that are being studied.

2.6.3 Definition and nature of e-commerce

As previously stated in the definition section of the dissertation in Chapter 1, e-commerce has been defined in a number of different ways ranging from the simple to the complex. The definition used is as follows and reflects a broad use of the term:

E-Commerce: The use of Internet technologies including, but not limited to, e-mail, EDI, electronic transactions, Intranets, and websites to exchange or share information, maintain or build business relations, and conduct transactions.

2.6.4 Nature of e-commerce

After defining e-commerce, it makes sense to consider the 'nature' of e-commerce as an innovation – specifically, how it will impact organizations' operations. Furthermore, if an innovation is unique it will most likely have its own adoption pattern (Dewar & Dutton 1986). Dewar and Dutton designed a model to classify innovations as either being 'radical' or 'incremental'. According to the authors, a radical innovation requires a high level of knowledge and can be considered a drastic change from existing practices, while an incremental innovation does not carry with it any significant knowledge requirements and only slightly improves or alters existing practices (Dewar & Dutton 1986). Based on this classification scheme, e-commerce would be considered a radical innovation. As e-commerce is drastically changing traditional business practices, including, but not limited to, radically changing the ways in which companies communicate internally and externally, exchange information, market to their customers, and engage in procurement, classifying e-commerce as a radical innovation would be appropriate (MacGregor & Vrazalic 2004; Lee 2001; Mehrtens, Cragg & Mills 2001). Dewar and Dutton's classification scheme allows for very little middle ground as the difference between a radical and incremental innovation is quite large. Thus it makes sense to look at classification systems that deal specifically with Information Technology (IT) to provide further clarification about e-commerce and its nature as an innovation.

Fichman (1992) proposed an IT classification system that was similar to Dewar and Dutton's (1986) model in that it consisted of only two classification categories. However, Fichman (1992) defined his categories differently. He stated that IT could be classified as either being a Type I technology or a Type II technology, with Type I being defined as having low knowledge and low dependence by an organization; while Type II technologies have either high knowledge requirements or high user dependence. Based on Fichman's classification scheme, e-commerce would be considered a Type II technology as its adoption is almost always associated with a high degree of dependence and many function above and beyond e-mail and web browsing, and require a high degree of knowledge (MacGregor & Vrazalic 2004; Zhu, Kraemer & Xu 2002; Premkumar & Roberts 1999).

While Fichman's classification model includes the element of organizational dependency, it only consists of two categories and, much like Dewar and Dutton

(1986), it is open to the criticism of having too large of a gap between Type I and Type II technologies. Hence Swanson's (1994) technology classification model will be discussed as it offers three categories of classification with a midpoint. Swanson's classification system assesses technology with regard to the impact it has on the business and consists of three levels: Type I innovations are simple and have limited impact, usually restricted to information system changes or improvements; Type II innovations impact business-wide administration; and Type III innovations impact core business technology and administration procedures and are integrated throughout the business (Swanson 1994). In the same way as the two previous models, e-commerce can again be categorized in the most influential or complex category as it is a Type III innovation according to Swanson's classification method. This classification results from the high degree of integration that is required to adopt and use e-commerce (MacGregor & Vrazalic 2004) and the substantial impact the technology has on the business (Wu, Mahajan & Balasubramanian 2003; USSBA 2000; Poon & Swatman 1997). Numerous other researchers have concluded that e-commerce alters organizational structure, operations, practices, and the application of information technology (Chau & Turner 2001; Kendall & Kendall 2001; Kuljis, Macredie & Paul 1998).

Thus the conclusion that e-commerce is a complex innovation lends credence to the previous examination of innovation and IT adoption literature, specifically the research that pertains to the adoption of complex technologies that are associated with a high degree of knowledge and result in significant changes to the way in which business is conducted. Furthermore, it justifies the extension of the literature review to e-commerce adoption and SMEs, as e-commerce likely has its own adoption pattern. The next section will discuss how firms adopt e-commerce.

2.6.5 How SMEs adopt e-commerce

There has been some debate over how SMEs adopt e-commerce. One approach has firms following an incremental step or stage pattern starting with simple technologies such as e-mail, web browsing, or establishing a website for their firm, and as the decision makers become more comfortable with the technology, adopting more complex measures such as online procurement or transactions. Researchers that use a stage model usually create steps which are represented by various Internet technologies. SMEs' e-commerce practices are first assessed and SMEs are then placed on one of the steps. As they reach milestones SMEs ascend up the ladder (MacGregor & Vrazalic 2004; CeBI 2003; Daniel, Wilson & Myers 2002). Such stage approaches are rooted in aspects of organizational theory and how SMEs (decision makers) learn. Frank (1988), as well as Reid and Smith (2000), both found that SMEs gain knowledge in stages and as they gain experience they move forward with a project. This type of stage model has been substantiated by authors in the field of internationalization (Gankema, Snuif & Zwart 2000; Reuber & Fisher 1997).

Drawing on research of incremental models and combining it with the theory that the Internet is not a single innovation, rather, it is a cluster of innovations from which businesses may pick and choose (White, Abels & Gordon-Murnane 1998; Van Slyke 1997; Prescott & Conger 1995), a number of authors have investigated whether SMEs adopt e-commerce in incremental stages. Daniel, Wilson and Myers (2002) developed an incremental pattern consisting of four stages and tested it on 678 SMEs

in the United Kingdom. They found that SMEs do, in fact, adopt e-commerce in stages and that the steps are cumulative, meaning that each firm continues to engage in the activities from the previous stage as they adopt the activities in the next stage. Venkatraman and Henderson (1998) developed a staged model for virtual oganizations that featured three stages. The researchers based their model on the premise that the Internet and IT have enabled companies to become virtual organizations. Their model, much like other work in the field, starts with companies employing `task units` at stage one such as customer service and/or procurement. Stage two occurs when companies start to focus on the use of the Internet and IT to create superior value and includes such processes as dymanic customization and process interdependence. The final stage uses the Internet to create sustained innovation and growth and uses technologies like customer communities and resource coalitions. The authors proceeded to substantiate their model by drawing on their industry knowledge and providing detailed examples of companies who proceeded through the stages. The model developed in this research reconfirms Venkatraman's earlier work on IT models (1994) in which he stated that higher stages of IT use results in more benefits but these stages must be accompanied by high degrees of organizational change. Additionally, the Canadian government conducted a series of studies with SMEs using both survey and focus groups and found that SMEs do, in fact, follow such a sequential pattern in e-commerce adoption.

> *'...the adoption of Internet Business solutions by small and medium businesses (SMEs) appear to follow a stable and predicable path. SMEs first adopt simple customer facing solutions such as Websites and e-mail. SMEs then adopt more complex internal or supplier-facing technologies such as e-procurement, accounting and finance solutions'* (CeBI 2003, p. 3).

Further evidence and support for an incremental stage model has been found in research conducted by Cloete and Courtney (2002), Costello and Tuchen (1998), Willcocks, Sauer & Associates (2000) and Blair (2000).

Other authors have found some support for the stage model, but question whether companies have to start at the lowest stage. Rao, Metts and Mong (2003) completed seven case studies, then surveyed 153 SMEs from 17 countries and found that while the stage model can be used to explain e-commerce adoption, not all firms start at the lowest level. They attribute their findings to the fact that the most basic e-commerce technologies such as e-mail and web browsing have become accepted business practices and some firms may choose to add these simple technologies concurrently with more sophisticated solutions. Levy and Powell (2003), in an article that calls into question the existence of a stage model, found evidence supporting Rao, Metts and Mong's (2003) findings that SMEs may jump initial sequential steps. Levy and Powell (2003) attribute this 'jumping' of steps to owners who recognize the business value of sophisticated e-commerce technologies. It should be noted that their research consisted of only 12 participants and that their findings do not directly discount the existence of a stage model, as they found that most companies started with e-mail or web browsing. However, they found that most SMEs do not progress beyond simple technologies.

Additional criticism of stage models includes that it is too simple to explain the adoption of e-commerce (Culkin & Smith 2000), that it does not account for individual differences in SMEs (Matlay 2000; Hawkins, Winter & Hunter 1995), it does not account for other facilitators of adoption (MacGregor et al. 2003; MacGregor, Bunker & Waugh 1998), and that it does not take into consideration any enterprise-wide planning that often occurs with the adoption of technology as complex as e-commerce (MacGregor &Vrazalic 2004; MacGregor et al. 2003; Tetteh & Burn 2001).

Many of the authors that find problems with the incremental stages or steps approach often advocate the Enterprise Wide Business (EWB) system approach to explain the adoption and advancement of e-commerce (MacGregor & Vrazalic 2004; MacGregor et al. 2003; Tetteh & Burn 2001). The EWB model states that most SMEs engage in enterprise-wide planning to ensure that the changes brought about by the Internet are disseminated through the entire organization (MacGregor & Vrazalic 2004; MacGregor et al. 2003). Some research has pointed to the development of such a system. MacGregor et al. (2003), in a survey of 350 Swedish SMEs, all with less than 50 employees, found that 148 had developed such an EWB. MacGregor and Vrazalic (2004) found some additional support for EWB. While there may be some support for the EWB approach, the theory that SMEs engage in enterprise-wide planning prior to the adoption of e-commerce directly contradicts much of what is known about SMEs and planning. As illustrated in the SME section of the literature review (see Section 2.4), various authors have noted that the majority of SMEs rarely or never engage in such strategic or long-term planning that would accompany EWB (Woods & Joyce 2003; Stonehouse & Pemberton 2002; Lyles et al. 1993; Robinson & Pearce 1984). Furthermore, IT studies have indicated that SMEs rarely plan for the acquisition of IT and a number of e-commerce studies indicate that e-commerce usually does not result from careful planning (Ching & Ellis 2004; Cloete & Courtney 2002; Fast Forward 3.0 2002; Johnston, McClean & Wade 2004, III 2003, II 2002).

Additionally, some critics of the linear approach, specifically advocates of the EWB model, may be drawing comparisons where none should be made. The linear approach is most commonly used as a classification tool (CeBI 2003; Daniel, Wilson & Myers 2002), not as a model to explain adoption or the extent of adoption. While the planning involved in the EWB model is most likely a reason that sophisticated e-commerce solutions are in place, it is not an explanation of the actual adoption process therefore the debate may be irrelevant. For convenience, the stages models are summarized in Table 2.5.

Thus a review of the literature on how SMEs adopt e-commerce reveals that most SMEs follow a sequential stage model in adopting e-commerce. However, as illustrated by Rao, Metts and Mong (2003), some SMEs may jump over the most basic e-commerce technologies as they have become common business practices.

Table 2.5: Summary research on the stages of e-commerce adoption

Author	Stage or Sequential Models
Status of e-commerce in Atlantic Canada 1998	1. Basic connectivity 2. Website used for promotional purposes 3. Purchasing, taking orders via website, providing customer service 4. Complete transactions, making or accepting payments
Cloete and Courtney 2002	1. Static pages for ads and e-mail communication with clients. External communication will include inquiries and quotes from customers, procurement processes between businesses and many other EDI exchanges. 2. Database integration, involving complete and interactive catalogues. Shopping cart technology and secure payments becomes an integral part of all the transaction processing generated by websites. To complete the transaction processes, order info and queries need to be followed up and shipping status tracked through web procedures. 3. Fully-Fledged e-commerce which encapsulates all the info processing of the previous stages, plus more interactive features, personalization and CRM tools.
Daniel, Wilson and Myers 2002	1. Developing first e-commerce services. 2. Use e-mail to communicate with customers, suppliers and employees. 3. Have information-based websites operating and are developing on-line ordering facilities. 4. Have on-line ordering in operation and are developing payment capabilities.
Johnston, McClean & Wade 2004, III 2003, II 2002	1. Online internal operations (e-mail, intranets) 2. Online marketing 3. Online purchasing 4. Online customer service 5. Online selling
Rao, Metts and Monge 2003	1. Presence – company has website, no integration 2. Portal – two way communication between company and customer 3. Transaction Integration – financial transactions are completed either by selling or making purchases 4. Enterprise Integration – integration of business processes, high level of collaboration between company and stakeholders
Willcocks, Sauer & Associates 2000	1. Web presence: develop presence and technology capability 2. Access Information → Transact business: re-orientate business/technology thinking skills and build integrated approach = web + systems 3. Further integration of skills, processes, technologies: reorganize people/structures, reengineer processes and remodel technology infrastructure. 4. Capability, leveraging experience and know-how to maximize value: customer-focused organization, content-centric services/products and 'the new marketing.'

2.6.6 Benefits of e-commerce adoption

When the Internet (e-commerce) started to become popular as an innovation in the 1990s, some questions emerged as to whether or not the technology would be beneficial to SMEs (MacGregor & Vrazalic 2004; Fast Forward 2.0 2001). These questions were answered as research from a variety of countries including, but not limited to, Australia (MacGregor & Vrazalic 2004; Van Akkern et al. 1999; Poon & Swatman 1997), Canada (McClean, Johnston & Wade 2002), Denmark (Beck, Wigand & König 2005), France (Beck, Wigand & König 2005), Germany (Beck, Wigand & König 2005), Greece (Buhalis & Deimezi 2003), New Zealand (Mehrtens, Cragg & Mills 2001), Peru (Tsuja & Nishimura 2002), Samoa (Purcell 2002), South Africa (deKlerk & Kroon 2005; deKlerk 2005; Cloete & Courtney 2002), Sweden (MacGregor & Vrazalic 2004), the United Kingdom (Daniel & Grimshaw 2002; Daniel & Wilson 2002; Scupola 2002), and the United States (Lohrke, Franklin & Frownfelter 2006; Wu, Mahajan & Balasubramanian 2003; Riemenschneider & McKinney 2001-02) indicated numerous short and long-term benefits associated with the use of the technology. The benefits of e-commerce were not only substantiated in various geographical areas, but also when incorporating a variety of definitions for SMEs, including definitions of small businesses as businesses of fewer than 50 employees (MacGregor & Vrazalic 2004; Cloete & Courtney 2002; Purcell 2002) or definitions of SMEs as having fewer than 500 employees (Riemenschneider & McKinney 2001 – 2002; Wu, Mahajan & Balasubramanian 2003).

One of the most cited benefits of e-commerce to SMEs revolves around the use of e-mail to improve communications (Riemenshneider & McKinney 2001-2002; Mehrtens, Cragg & Mills 2001; Sillince 1998). E-mail allows SMEs to send messages and information at reduced costs, to improve the speed it takes to send material, and allows for always-on communication with internal and external stakeholders (Lohrke, Franklin & Frownfelter 2006; Johnston, McClean & Wade 2004; Wu, Mahajan & Balasubramanian 2003; Scupola 2002; Mehrtens, Cragg & Mills 2001; Ling 2000; Van Akkeren et al. 1999; Poon & Swatman 1997). Additionally, e-mail allows for an increased sharing of information and the distribution of digital products (Biggers 2005; Johnston, McClean & Wade 2004; Wu, Mahajan & Balasubramanian 2003; Daniel & Wilson 2002; Purcell 2002; Scupola 2002; Tsuja & Nishimura 2002; Riemenshneider & McKinney 2001-02; Mehrtens, Cragg & Mills 2001; Ling 2000; Dutta & Evrard 1999; O'Brien 1998; Sillince 1998; Poon & Swatman 1997).

E-commerce also improves the quantity and quality of information that SMEs access. Numerous authors including Mehrtens, Cragg and Mills (2001), Riemenshneider and McKinney (2001-02), and Dutta and Evrard (1999) state that e-commerce allows SMEs to access more information. In addition to the improved quantity of information, other authors have found that e-commerce allows SMEs to access better quality information (Biggers 2005; MacGregor & Vrazalic 2004; Qualye 2002; Poon & Swatman 1997; Abell & Limm 1996).

SMEs can also realize significant improvements in their marketing efforts by adopting e-commerce. In a study of 458 SMEs in Denmark, France, Germany and the United States, Beck, Wigand and König (2005), found that e-commerce allows for increased sales and market potential. These findings are supported by Wu,

Mahajan and Balasubramanian (2003) in their study of 144 SMEs in the United States and by Daniel and Grimshaw (2002) in their research on 1291 SMEs in the United Kingdom. Other authors concur with these findings (Johnston, Wade & McClean 2007; Lohrke, Franklin & Frownfelter 2006; Burgess, Sellitto & Wenn 2005; deKlerk & Kroon 2005; Ramsey et al. 2005; Johnston, McClean & Wade 2004; Daniel & Wilson 2002; Purcell 2002; Quayle 2002; Scupola 2002; Napier 2001; Raymond 2001; Ritchie & Brindley 2001; Sparkes & Thomas 2001; Gloor 2000; Lituchy & Rail 2000; Vescovi 2000; McCue 1998; Poon & Swatman 1997).

Additionally, researchers have examined specific e-commerce technologies and how they pertain to marketing. Specifically, several authors cited advantages that SMEs can gain by using webpages to advertise their business. The most common benefits gained from websites include lower advertising costs (Servais, Madsen & Rasmussen 2007; Mehrtens, Scupola 2002; Purcell 2002; Cragg & Mills 2001; Gloor 2000; Lituchy & Rail 2000; McCue 1998) and improved visibility of the company and its products (Ramsey et al. 2005; Scupola 2002; Davis 2001; Mehrtens, Cragg & Mills 2001; Lituchy & Rail 2000).

Additional marketing benefits include improvements to customer relationship management (CRM) (Johnston, Wade & McClean 2007; Servais, Madsen & Rasmussen 2007; Johnston, McClean & Wade 2004; Wu, Mahajan & Balasubramanian 2003; Daniel & Grimshaw 2002; Daniel & Wilson 2002; Tsuja & Nishimura 2002; Gloor 2000; Ling 2000; Steinfield & Whitten 1999; Van Akkeren et al. 1999), improvements to products (Johnston, McClean & Wade 2004; Chaudhury 2002;) and the ability to reach international markets (Knight & Cavusgil 1997; deKlerk 2005; Purcell 2002; Scupola 2002; Steinfield & Whitten 1999; Van Akkeren & Cavaye 1999).

In addition to the cost savings incurred in marketing, e-commerce offers SMEs the potential to save money in other areas as well. Johnston, Wade and McClean (2007), in a study on 1666 European and North American SMEs found Internet technologies reduce costs across a number of areas. Research has indicated that e-commerce can reduce administrative costs (MacGregor & Vrazalic 2004; McClean, Johnston & Wade; 2002; Qualye 2002; Scupola 2002; Poon & Swatman 1997; Abell & Limm 1996), lower production costs (MacGregor & Vrazalic 2004; McClean, Johnston & Wade 2002; Qualye 2002; Scupola 2002; Poon & Swatman 1997; Abell & Limm 1996), improve supply chain management (Wu, Mahajan & Balasubramanian 2003; Kaplan & Sawheny 2000; Nairm 2000; Wise & Morrison 2000), reduce transaction costs (Collins 2005; Wu, Mahajan & Balasubramanian 2003; Saloner & Spence 2002; Dutta & Evrard 1999; Poon & Swatman 1997), and reduce the cost of goods sold (Johnston, Wade & McClean 2007).

Adopting e-commerce can also result in SMEs becoming more efficient (Beck, Wigand & König 2005; MacGregor & Vrazalic 2004; Johnston, McClean & Wade 2004; Wu, Mahajan & Balasubramanian 2003; Scupola 2002; Riemenshneider & McKinney 2001-02; Gloor 2000; O'Brien 1998; Poon & Swatman 1997; Abell & Limm 1996), result in increased revenue (Johnston, Wade & McClean 2007; Servais, Madsen & Rasmussen 2007; deKlerk 2005; deKlerk & Kroon 2005; Ramsey et al. 2005; McClean, Johnston & Wade 2002; Gloor 2000; USSBA 2000; McCue 1998; Poon & Swatman 1997), assist in supporting business objectives (Mehrtens, Cragg &

Mills 2001), improve competitiveness (MacGregor & Vrazalic 2004; Daniel & Wilson 2002; Riemenshneider & McKinney 2001-02; Gloor 2000), improve relationships with partners (Poon & Swatman 1997; Abell & Limm 1996), and improve relationships with the community (Steinfield & Whitten 1999). Hence it can be concluded that e-commerce adoption, even in its simplest form (e-mail or hosting a company webpage), results in benefits to SMEs. For convenience the results are summarized in Table 2.6.

Table 2.6: Benefits of e-commerce to SMEs

Benefits to SMEs	Author(s)
Access to information (Global & Domestic)	Dutta & Evrard 1999 Mehrtens, Cragg & Mills 2001 O'Brien 1998 Riemenshneider & McKinney 2001-02
Administration cost savings	Abell & Limm 1996 Johnston, Wade & McClean 2007 MacGregor & Vrazalic 2004 McClean, Johnston and Wade 2002 Poon & Swatman 1997 Qualye 2002 Scupola 2002
Allow for internationalization of business	deKlerk 2005 Knight & Cavusgil 1997 Purcell 2002 Scupola 2002 Steinfield & Whitten 1999 Van Akkeren & Cavaye 1999
Closer relations with community	Steinfield & Whitten 1999
Closer relations with partners	Abell & Limm 1996 deKlerk & Kroon 2005 Poon & Swatman 1997
Conducting business anywhere, anytime	Ling 2000 Scupola 2002 Van Akkeren et al. 1999
Distribution of digital products	Ling 2000 Van Akkeren et al. 1999
Improved communications	Biggers 2005 Daniel & Wilson 2002 Dutta & Evrard 1999 Lohrke, Franklin & Frownfelter 2006 Mehrtens, Cragg & Mills 2001 Johnston, McClean & Wade 2004 O'Brien 1998 Poon & Swatman 1997 Purcell 2002 Riemenshneider & McKinney 2001-02 Scupola 2002 Sillince 1998 Tsuja & Nishimura 2002 Wu, Mahajan & Balasubramanian 2003

Benefits to SMEs	Author(s)
Improved customer relations management	Daniel & Grimshaw 2002 Daniel & Wilson 2002 Gloor 2000 Johnston, Wade & McClean 2007 Ling 2000 Lohrke, Franklin & Frownfelter 2006 Johnston, McClean & Wade 2004 Steinfield & Whitten 1999 Tsuja & Nishimura 2002 Van Akkeren et al. 1999 Wu, Mahajan & Balasubramanian 2003
Improved supply chain management (Reduction of transaction costs and increase the number of suppliers	Kaplan & Sawheny 2000 Nairm 2000 Porter 2001 Wise & Morrison 2000 Wu, Mahajan & Balasubramanian 2003
Improved competitiveness	Daniel & Wilson 2002 deKlerk 2005 deKlerk & Kroon 2005 Gloor 2000 MacGregor & Vrazalic 2004 Riemenshneider & McKinney 2001-2002
Improved marketing	Daniel & Grimshaw 2002 Johnston, Wade & McClean 2007 McCue 1998 MacGregor & Vrazalic 2004 Qualye 2002 Ramsey et al. 2005 Wu, Mahajan & Balasubramanian 2003
Improved products	Chaudhury 2002 Johnston, McClean & Wade 2004
Increased revenues	Burgess, Sellitto & Wenn 2005 deKlerk 2005 deKlerk & Kroon 2005 Gloor 2000 Johnston, Wade & McClean 2007 McClean, Johnston and Wade 2002 McCue 1998 Poon & Swatman 1997 Ramsey et al. 2005 USSBA 2000

Benefits to SMEs	Author(s)
Increased sales & market potential (Attract new customers; increase frequency of purchases; volumes)	Beck, Wigand and König 2005 Daniel & Grimshaw 2002 Daniel & Wilson 2002 Gloor 2000 Johnston, Wade & McClean 2007 Lituchy & Rail 2000 McCue 1998 Napier 2001 Johnston, McClean & Wade 2004 Poon & Swatman 1997 Purcell 2002 Quayle 2002 Raymond 2001 Ritchie & Brindley 2001 Scupola 2002 Sparkes & Thomas 2001 Vescovi 2000 Wu, Mahajan & Balasubramanian 2003
Integration of internal and external software	Scupola 2002
Levels the playing field between small and large businesses	Buhalis & Deimezi 2003 Cloete & Courtney 2002 O'Brien 1998 Poon & Swatman 1997 Riemenshneider & McKinney 2000-2002 Van Akkeren & Cavaye 1999
Marketing Tool (costs)	Collins 2005 Gloor 2000 Lituchy & Rail 2000 McCue 1998 Mehrtens, Cragg & Mills 2001 Purcell 2002 Scupola 2002
Marketing tool (visibility)	Davis 2001 Johnston, Wade & McClean 2007 Lituchy & Rail 2000 Mehrtens, Cragg & Mills 2001 Scupola 2002
Production costs	Abell & Limm 1996 McClean, Johnston and Wade 2002 Poon & Swatman 1997 Qualye 2002
Quality of information	Abell & Limm 1996 MacGregor & Vrazalic 2004 Poon & Swatman 1997 Qualye 2002
Reduced communication costs	Ling 2000 Mehrtens, Cragg & Mills 2001 Johnston, McClean & Wade 2004 Poon & Swatman 1997 Scupola 2002 Van Akkeren et al. 1999 Wu, Mahajan & Balasubramanian 2003
Reduced Transaction Costs	Biggers 2005 Collins 2005 Dutta & Evrard 1999 Poon & Swatman 1997 Saloner & Spence 2002 Wu, Mahajan & Balasubramanian 2003

Benefits to SMEs	Author(s)
Reduced total costs	Johnston, Wade & McClean 2007 McClean, Johnston and Wade 2002
Supports business objectives	Mehrtens, Cragg & Mills 2001
Time savings	Riemenshneider & McKinney 2001-02 Scupola 2002
Website as an advertising/information vehicle	Burgess, Sellitto & Wenn 2005 Houghton &Winklhofer 2004 Mehrtens, Cragg & Mills 2001 Scupola 2002 Tsuja & Nishimura 2002

2.6.7 Extent of SMEs' e-commerce Adoption

As illustrated in the previous section, SMEs that adopt e-commerce have the potential to realize significant benefits. However, an examination of research on the adoption and sophistication of adoption (intensity) of e-commerce by SMEs finds that they are most likely to adopt e-commerce technologies incrementally, are slow to adopt, are reluctant in the face of overwhelming evidence in favour of adoption, and many will not adopt beyond basic technologies such as e-mail or hosting a company website to market a business (Levenburg & Magal 2004-05; MacGregor & Vrazalic 2004; EU 2002; Johnston & Wade 2002; McClean, Johnston & Wade 2002; Fast Forward 2.0 2001). Furthermore, SMEs that do not adopt e-commerce are potentially losing out on revenue, cost savings and the ability to participate in global supply chains (MacGregor & Vrazalic 2004; McClean, Johnston & Wade 2002; Fast Forward 2.0 2001, 3.0 2002, 4.0 2003).

Levenburg (2005) surveyed 395 firms in the United States and found that most SMEs are limiting their use of e-commerce to research, communication and marketing. Fomin et al. (2005) compared several large data sets produced by the American government and concluded that SMEs are only using basic Internet tools. Further support for this assertion is noted by Pratt (2002), who surveyed 444 SMEs and found that 80% were using the Internet only for e-mail and to gather information. Other authors have noted that SMEs limit their use of the Internet to communicate and search for knowledge (Beck, Wigand & König 2005; Levenburg & Magal 2004-05; MacGregor & Vrazalic 2004; Cloete & Cortney 2003; Daniel, Wislon & Myers 2002; McClean, Johnston & Wade 2002).

After simple communications, the next most popular use of e-commerce is basic marketing, which usually consists of hosting a webpage and engaging in one way communication with stakeholders including buyers and/or sellers (Rao, Metts & Monge 2003; Daniel, Wilson & Myers 2002; EU 2002). Goode (2002), in a survey of 198 SMEs, found that SMEs limit their use of the Internet to hosting a website for marketing and most have no intentions to expand their use of e-commerce. The Gallup Organization, in a 2002 survey in the United States, found that most SMEs only establish websites and few have/are making plans to adopt more sophisticated e-commerce technologies such as online transactions or supply chain management. The use of the Internet or e-commerce primarily for marketing by American SMEs was also found by Riemenscheider, Harrison and Mykytyn (2003) and Wu, Mahajan and Balasubramanian (2003). Similar results were found in Australia (MacGregor & Vrazalic 2004; Poon & Swatman 1999; Poon & Swatman 1997), Canada (CeBI

2003; Fast Forward 4.0 2003, 3.0 2002, 2.0 2001), and the United Kingdom (Houghton & Winklhofer 2004; Daniel & Grimshaw 2002).

As noted above, SMEs that are adopting e-commerce are primarily doing so at the most basic level. SMEs appear to be quite hesitant to use sophisticated e-commerce, including, but not limited to, processing transactions and engaging in supply chain management (MacGregor & Vrazalic 2004; 4.0CeBI 2003; Saythe & Beal 2001). In Canada, it was determined that only 6% of small business (n<200 employees) and 12% of medium businesses (200 – 500 employees) engage in online sales (CeBI 2003). Results from various regions support the assertion that the majority of SMEs do not sell goods or make purchases online. In a survey of 161 Australian SMEs, MacGregor and Vrazalic (2004) found that only 35% had a website and 16% were engaged in e-commerce. Similar results were reported by Saythe and Beal (2001), who found that only 16% of Australian firms were making purchases online and 12% were conducting online sales. Three US studies found similar results of SMEs selling products online: 9% (Business Wire 2000), 20% (Riemenscheider, Harrison & Mykytyn 2003) and 27% (Dun & Bradstreet 2004). For convenience, a sample of findings on adoption of e-commerce in Europe is presented in Table 2.7. Note that while in most countries the majority of SMEs have access to the web, only a small percentage of SMEs make online purchases or sell their goods on the Internet.

Table 2.7: E-commerce adoption in Europe

% of SMEs	Having Web Access	Having a presence on Web via own website	Making e-commerce purchases	Making e-commerce sales
Austria	83	53	14	11
Denmark	86	62	36	27
Spain	66	6	9	6
Finland	91	58	34	13
Greece	54	28	5	6
Sweden	90	67	31	11
UK	62	49	32	16
Germany	82	65	35	29
Luxembourg	54	39	18	9
Netherlands	62	31	23	22
Italy	71	9	10	3
Norway	73	47	43	10

While the lack of SMEs adopting sophisticated e-commerce is troubling given all the benefits noted in Section 2.6.6, the more troubling findings may be:

- Many early adopters of e-commerce are reducing the number of e-commerce activities they use or are failing to increase their use of the technology (Houghton & Winklhofer 2004; CeBI 2003; Rao, Metts & Monge 2003; Fast Forward 2.0 2001, 3.0 2002, 4.0 2003)
- A significant percentage of firms (25-40%) have no intentions to adopt e-commerce (CeBI 2003; Goode 2002; Saythe & Beal 2001)

The size of the firm appears to be a significant factor when discussing e-commerce adoption. Larger businesses have been more likely to adopt e-commerce and are more likely to make use of sophisticated technologies (Barry & Milner 2002;

Riquelme 2002; Roberts & Wood 2002; Ruth 2000; Weiss 2000). Konstadakopulos (2006), in fact, found that size was the main determining factor in whether a SME adopted e-commerce. Even among SMEs, the larger the SME, the more likely it is to make use of e-commerce. The influence of size on e-business adoption is discussed later in the chapter, but the most common explanations are that larger firms are more likely to have IT specialists with e-commerce knowledge, engage in trade with larger purchasers or suppliers who demand it, and to be pushed in the general direction by competitive forces in the marketplace.

Therefore, if SMEs are not adopting sophisticated e-commerce technologies, one can conclude that SMEs may never realize many of the benefits described in Section 2.6.6. Beck, Wigand and König (2005) noted that SMEs that fail to adopt many e-commerce technologies will not realize the full benefits associated with e-commerce:

> *'E-commerce output and, therefore, the impact of e-commerce on business processes or e-commerce satisfaction depend directly on the intensity and variety of applications implemented'* (p. 45).

Other authors have found that SMEs may not experience the most significant benefits associated with the Internet and e-commerce because SMEs are failing to engage in sophisticated e-commerce (CeBI 2003; Fast Forward 2.0 2001, 3.0 2002, 4.0 2003).

Since the previous section on benefits illustrates how important e-commerce can be to SMEs, and this section highlights the lack of adoption in the face of supporting evidence, it makes sense to next examine facilitators and drivers of e-commerce to gain an understanding of what can be done to encourage SMEs to first adopt e-commerce and then become sophisticated users of the technology.

2.6.8 Factors influencing e-commerce adoption

A number of researchers have looked at what factors 'drive' or 'facilitate' e-commerce adoption in SMEs. Researchers have essentially taken one of two approaches to this subject:

1. To postulate that certain 'drivers' motivate SMEs to adopt e-commerce. Examples of such work include writings by Levenburg, Magal and Kosalge (2006), Levenburg and Magal (2005), MacGregor and Vrazalic (2004), Daniel and Wilson (2002), and Daniel and Grimshaw (2002). These authors review past research on e-commerce and/or IT adoption and select potential drivers that have been identified and apply them to their study. As noted by Wymer and Regan (2005), many of the authors do not discuss why they opted not to use 'drivers' from other researchers or adopt intention models that are discussed in category two. For example Merhrtns, Cragg and Mills (2001) note that 'Relative Advantage' is a key driver of e-commerce adoption but make no reference to Rogers's DOI in the discussion section of their paper. Included in this grouping are authors who have used case study research to identify drivers of e-commerce such as Levy and Powell (2003) and Martin and Matlay (2003).

2. To adopt ‘behaviour intention models’ from social psychology that have been used successfully in explaining adoption in information technology and information systems research (Johnson & Hardgrave 1999; Harrison et al. 1997). As in IT research, authors select one of the more reputable theories such as TAM (Lederer, Maupin & Zhuang 1998), TPB (Riemenschneider, Harrison & Mykytyn, 2003) or Rogers’s DOI (Looi 2005; Raymond, Bergeron and Blili 2005; Sathye & Beal 2001) and apply it to their research. Much like IT, researchers who have used intention models rarely discuss competing models or justify reasons for selecting one model over another (Wymer and Regan 2005; Venkatesh et al. 2003). It should be noted that authors who use ‘behaviour intention models’ sometimes add, remove or modify constructs to try to gain a greater understanding of their research problem; these papers are included in this category as well.

The literature review will now review factors that influence adoption using these two categories. Prior to this, the research on facilitators of e-commerce is summarized in Table 2.8 table for convenience.

Table 2.8: Facilitators/Drivers of Adoption

Author	Partici-pants n = size of SME	Proposed Model; basis for the research and/or facilitators of adoption/extent[1] Note – if none are listed it was due to lack of information or specifics	Depen-- dent Variable	Data Collection Method	Analysis	Findings including the facilitators/ drivers of IT adoption and/or extent are:
Auger & Gallaugher 1997	141 SMEs in the United States. Only surveyed firms that were online and had < $500,000 annual sales.	1. Access to an Affluent Customer Base 2. Lower Information Dissemination Costs 3. Lower Transaction Costs 4. Broader Market Reach Increased Service 5. Additional Channels for Customer Feedback 6. Consumer and Market Research	Adoption	Survey	T-tests	Drivers of e-commerce: 1. Increasing sales and expanding geographic reach 2. Financial benefits 3. Low development and maintenance costs 4. Interest in experimenting with a new tool 5. Desire to promote products and build company's image 6. Financial considerations 7. Benefits in obtaining and disseminating information 8. Competitive considerations
Beck, Wigand & König 2005	458 SMEs in Denmark, France, Germany and the United States n > 25 < 249		Adoption & Extent	Survey	DEA Analysis	1. Potential to reduce costs 2. Expand markets 3. CRM 4. Supplier relations
Ching & Ellis 2004	84 SMEs in Hong Kong n > 20 < 100	1. DOI 2. Decision Makers Characteristics 3. Environmental Characteristics	Adoption & Extent	Survey	ANOVA	1. The younger the adopter, the more Internet 2. Relative advantage (most important factor) 3. Compatibility 4. Cost effectiveness (perception) 5. Customer pressure
Cloete & Courtney 2002	34 SMEs (manufacturing) in Western Cape, South Africa n < 50	Perceived Benefits	Adoption	Survey	%ages	Perceived benefits of e-commerce
Daniel & Grimshaw 2002	1291 small and large companies. n < 250 (678 SMEs)	1. Customer Benefits 2. Competitive Pressure 3. Internal Processes 4. Suppliers	Adoption & Extent	Survey	ANOVA	1. Responding to competitors 2. Providing enhanced customer services 3. Improving relationships with customers/suppliers
Daniel & Wilson 2002	678 SMEs in the United Kingdom n < 250					1. Responding to competitive pressures 2. Improving customer relations (attracting new customers, knowledge sharing in the firm, improving service while reducing costs) 3. Improvements to supply chain management (reduce costs and increase the number of potential suppliers)

Author	Partici-pants n = size of SME	Proposed Model; basis for the research and/or facilitators of adoption/extent[1] Note – if none are listed it was due to lack of information or specifics	Depen-- dent Variable	Data Collection Method	Analysis	Findings including the facilitators/ drivers of IT adoption and/or extent are:
Drennan & Kennedy 2000	173 SMEs (pharmaceutical) 98 potential adopters, 75 users	1. Previous IT Benefits Experienced 2. Anticipated Future Benefits	Adoption & Extent	Survey	Structural Equation Modeling	1. Past IT benefits experienced 2. Anticipated future benefits
Fomin et al. 2005	SMEs in the United States n>250		Adoption & Extent	Data Sets from the US Census and other surveys	Means, %ages, Tables	1. Expand marketing for products or services 2. Improve coordination with customers and suppliers 3. Enter new business markets
Grandon & Pearson 2003	71 SMEs in the United States n < 500	1. Organizational Support 2. Management Productivity 3. Strategic Decision Aides 4. External Pressure 5. TAM 6. DOI	Adoption	Survey	Canonical & Factor Analysis	1. Top managers' perception of useful. 2. Organizational support 3. Decision aids 4. PU 5. PEOU 6. Compatibility 7. External pressures
Grandon & Pearson 2004a	83 SMEs in Chile n < 500	1. Organizational Support 2. Managerial Productivity 3. Decision Aids 4. Organizational Readiness 5. Compatibility 6. External Pressure 7. TAM	Adoption	Survey	Discriminant Analysis & T-tests	1. Organizational readiness 2. Productivity 3. External pressure 4. Decision aids 5. Compatibility 6. Perceived usefulness
Grandon & Pearson 2004b	100 SMEs in the United States n < 500	1. Organizational Readiness 2. External Pressure 3. Organizational Support 4. Managerial Productivity 5. Strategic Decision Aids 6. TAM	Adoption	Survey	Canonical	1. Perceived usefulness 2. Perceived ease of use 3. Compatibility 4. External pressures PU & PEOU most influential. Additionally: Managers who have a positive attitude
Houghton & Winklhofer 2004	25 SMEs in the United Kingdom Exporting 10% of their turnover for more than a year. Targeted owner-managers and senior managers. n <250		Extent	Interviews	Patterns	Trading partners

Author	Partici-pants n = size of SME	Proposed Model; basis for the research and/or facilitators of adoption/extent[1] Note – if none are listed it was due to lack of information or specifics	Depen-- dent Variable	Data Collection Method	Analysis	Findings including the facilitators/ drivers of IT adoption and/or extent are:
Konstada-kopulos 2006	56 SMEs in Vietnam	1. Size 2. Age of Entrepreneur 3. Education of Entrepreneur 4. Collaborative Arrangements with other firms	Adoption	Survey	Logit Regression	Facilitators: 1. Size 2. Education Level Barriers: 1. Lack of Capital 2. Lack of knowledge
Lee 2004	71 SMEs in the United States n<50	1. Relative Advantage (DOI) 2. Compatibility (DOI) 3. Ease of Use (TAM) 4. Computer Self Efficacy (Literacy) 5. Financial Slack 6. Innovativeness of Firm 7. Image (Subjective Norm) 8. Competitive Pressure	Adoption & Extent	Surveys	Discriminan t Analysis	Main facilitator is owner-managers' literacy. Other facilitators of some technologies: 1. Compatibility 2. Relative advantage 3. Financial slack
Levenburg & Magal 2005	439 SMEs in the United States n<500	1. To gain a competitive advantage 2. Increase sales 3. Accomplish advertising, promotion and public relations 4. Enhance the firm's image 5. Improve customer satisfaction 6. Improve customer retention 7. Develop and strengthen relationships 8. Improve Financial Performance 9. Obtain Information	E-business Motives (Adoption)	Survey	T-tests, IPA	Firms motivated by simple customer focus strategies (technologies that aid in customer relations)
Levenburg 2005	395 SMEs in the United States n<250		Extent	Survey	Comparing Means	Firms use the Internet for: 1. Research 2. Marketing 3. Communication
Levenburg, Magal & Kosalge 2006	439 SMEs in the United States n< 500	1. Strategy 2. Firm Demographics 3. Owner/Management	E-business Motives (Adoption)	Survey	GLM	1. Firms motivated by perceived benefits (enhanced company image, improved communications). 2. Innovative firms most likely to adopt.
Levy & Powell 2003	12 case studies of SMEs n > 10 < 250		Adoption & Extent	Case Study	Patterns	Drivers of e-commerce: 1. Owner's Knowledge 2. Owner's attitude toward growth 3. Owner in general

Author	Partici-pants n = size of SME	Proposed Model; basis for the research and/or facilitators of adoption/extent[1] Note – if none are listed it was due to lack of information or specifics	Depen-- dent Variable	Data Collection Method	Analysis	Findings including the facilitators/ drivers of IT adoption and/or extent are:
Looi 2005	184 SMEs in Brunei Darussalam n>100	Rogers plus additional constructs	Adoption of e-commerce	Survey	Multiple Regression	1. Competitive pressure 2. IT Knowledge 3. Relative advantage 4. Security 5. Government support
MacGregor & Vrazalic 2004	473 SMEs in Australia and Sweden. Targeted owner-manager. Emphasis on micro enterprises. n < 10		Adoption & Extent	Survey	%s & Comparison of Means	Drivers of e-commerce: 1. Improve customer service 2. Increase sales 3. Increase competitiveness 4. Improve marketing
Martin & Matlay 2003	30 SMEs in the United Kingdom (West Midlands) Surveyed and then completed 3 case studies of small firms. They were using the Internet.		Extent	Case Study	Patterns	Owners-managers with relevant skills and knowledge more likely to recognize benefits of the Internet and use it in their business.

Author	Partici-pants n = size of SME	Proposed Model; basis for the research and/or facilitators of adoption/extent[1] Note – if none are listed it was due to lack of information or specifics	Depen-- dent Variable	Data Collection Method	Analysis	Findings including the facilitators/ drivers of IT adoption and/or extent are:
Mehrtens, Cragg & Mills 2001	7 SMEs in New Zealand It was also important that the organizations had adopted at least one of the following parts of the Internet: e-mail, Internet browsing, or a website. With respect to the non-adopter, the organization had made a conscious decision not to adopt the Internet. n <200	1. Perceived Benefits 2. Organizational Readiness 3. External Pressure	Adoption & Extent	Case Study	Patterns	Factors that influence Internet adoption: 1. Manager to champion the Internet 2. Perceived benefits (e-mail, web browsing, website development) 3. Organizational readiness (employee knowledge, owner-manager knowledge, owner-manager champion, computer infrastructure) 4. External pressure (customers, suppliers and employees)
Mirchan-dani & Motwani 2001	62 SMEs 26 adopted, 36 had not. n <200	1. DOI 2. TAM 3. Top Management Enthusiasm 4. Management Time 5. Employee Knowledge 6. Cost	Adoption	Interviews	Discriminant Analysis	1. Enthusiasm of top manager/CEO 2. Compatibility 3. Relative advantage 4. Employee knowledge
Molla 2005	150 South African firms	Perceived Organizational e-Readiness & Perceived Environmental e-Readiness	Adoption & Extent	Survey	Discrimi-nant Analysis	
Pflughoeft, Ramamur-thy, Soofi, Yasai-Ardekani & Zahedi 2003	297 SMEs in the United States (first sample); 536 (second sample) including 75 non-adopters. n > 10 < 500	1. Context 2. IT Infrastructure 3. Web Use 4. Web Benefits	Adoption & Extent	Survey	Structural Equation Modeling	1. Organization's contextual characteristics (market pressure and scope of operations) 2. IT infrastructure 3. IT sophistication.

Author	Partici-pants n = size of SME	Proposed Model; basis for the research and/or facilitators of adoption/extent[1] Note – if none are listed it was due to lack of information or specifics	Depen-- dent Variable	Data Collection Method	Analysis	Findings including the facilitators/ drivers of IT adoption and/or extent are:
Poon & Swatman 1997	Case studies of small Australian businesses which are active Internet users. Small Business based on Australian Bureau of Statistics n < 200		Adoption	Case Study	Patterns	1. Management commitment 2. Perceived benefits
Poon & Swatman 1999	23 SMEs in Australia. Owner(s) have ultimate control over the business direction and decisions. SMEs were actively engaged in online activities. n <20		Extent	Case Study	Patterns	1. Perceived long-term benefits 2. Management support
Premkumar & Roberts 1999	78 rural SMEs in the United States.	1. Relative Advantage 2. Costs 3. Complexity 4. Compatibility 5. Top Management Support 6. Size 7. IT Expertise 8. Competitor Pressure 9. External Support 10. Vertical Linkage	Adoption & Extent	Interview	Discriminant Analysis	Facilitators of EDI, online data access, e-mail and the Internet: 1. Relative advantage 2. Top management support 3. IT expertise Differences between adopters and non-adopters: 1. Compatibility 2. Complexity 3. External pressure 4. Business size

Author	Partici-pants n = size of SME	Proposed Model; basis for the research and/or facilitators of adoption/extent[1] Note – if none are listed it was due to lack of information or specifics	Depen-- dent Variable	Data Collection Method	Analysis	Findings including the facilitators/ drivers of IT adoption and/or extent are:
Raymond, Bergeron & Blili 2005	108 SMEs in Canadian n< 338	DOI plus additional factors	Extent	Survey	Partial Least Squares Regression	1. Network intensity (external influence) 2. Aggressiveness of strategic orientation (aggressively pursuing growth) 3. Managerial context (experience & education) 4. Manufacturing context (type) 5. Manufacturing technology
Riemensch neider & McKinney 2001 – 2002	184 SMEs n <500	1. TPB	Adoption	Survey	Discriminant Analysis	Adopters of e-commerce: 1. Employ more people (larger) 2. Perceived more benefits 3. More likely to have stronger normative beliefs (subjective norm)
Riemen-schneider, Harrison & Mykytyn 2003	92 SMEs in the United States had not adopted the web. n < 500	1. TAM 2. TPB	Adoption & Extent	Survey	Structural Equation Modeling	1. Found support for a combined TAM and TPB model. 2. Concluded that subjective norm and PU (not aware of benefits) are two reasons why firms adopt or do not adopt the Internet. 3. PCB and EOU were not as significant as barriers/ facilitators.
Saloheimo 2005	6 SMEs in Finland n<10 with turnover < $2 million euros		Extent	Case Study	Patterns	1. Orientation toward growth 2. Orientation toward customers
Sathye & Beal 2001	343 SMEs in Australia n < 200	1. DOI	Adoption & Extent	Survey	Multiple Regression	Found support for DOI Most important factors: 1. Relative advantage 2. Compatibility
Scupola 2002	6 SMEs in the United Kingdom. They had an Internet connection for at least three years. n <300		Adoption	Case Study	Patterns	Main adoption trigger was chance. Other triggers: 1. Opportunity 2. Necessity

Author	Partici-pants n = size of SME	Proposed Model; basis for the research and/or facilitators of adoption/extent[1] Note – if none are listed it was due to lack of information or specifics	Depen-- dent Variable	Data Collection Method	Analysis	Findings including the facilitators/ drivers of IT adoption and/or extent are:
Seyal et al. 2004	54 SMEs in Pakistan n<250	1. Perceived Benefits 2. Task Variety 3. Organizational Culture 4. Government Support 5. Management Support 6. Organizational Culture	Adoption	Survey	Multiple Regression	1. Perceived benefits 2. Task variety 3. Organizational culture 4. Government support
Sillence et al. 1998	360 SMES in the United States n=10 - 250		Adoption of email	Survey	%ages	Drivers: 1. Faster communication 2. Influence of other organizations 3. Ease of use
Tsuja & Nishimura 2002	3 MEs in Peru n=200–1000	1. Perceived Benefits 2. Organizational Factors 3. Environment Factors	Adoption & Extent	Case Study	Patterns	Main factors that influence adoption and extent of adoption: 1. Perceived benefits 2. Organizational factors (financial and technological resources) 3. Subjective norm (customers and vendors) Additional Findings: 1. Management support of e-commerce linked with e-commerce adoption and the extent of adoption. 2. Employee IT knowledge supports adoption and extent of e-commerce. 3. Organizations with experience using IT more likely to adopt e-commerce and sophisticated e-commerce. 4. Financial resources not important to initial adoption decision. Increase in importance for extent of adoption. 5. Customer influence and vendor support increase adoption and extent of adoption.
Van Akkeren & Cavaye 1999	3 SMEs in Australia Owner-managers					Internet adoption: 1. Owner/manager characteristics: perceived benefits, computer literacy, assertiveness, perceived control, subjective norm, mistrust of IT industry, lack of time. 2. Return on investment 3. Firm characteristics: organizational readiness, external pressure to adopt, customer/supplier dependency, structural sophistication of the firm, size, sector, status, information intensity.

Author	Partici-pants n = size of SME	Proposed Model; basis for the research and/or facilitators of adoption/extent[1] Note – if none are listed it was due to lack of information or specifics	Depen--dent Variable	Data Collection Method	Analysis	Findings including the facilitators/ drivers of IT adoption and/or extent are:
Van Beveren & Thomson 2002	178 SMEs (manufactur-ing) in Australia n < 255					Main factor that influences e-commerce adoption is size. Author attributes this to lack of knowledgeable employees and lack of knowledge about benefits of e-commerce.
Wymer & Regan 2005	102 SMEs in the United States n<500	26 Factors were posited from the following categories: 1. Environmental Factors 2. Knowledge Factors 3. Organizational Factors 4. Technology Factors	Adoption & Extent	Survey	ANOVA & t-Tests	Cost identified as a consistent barrier; competitive pressure influenced adopters; a range of benefits identified as facilitators.
Wu, Mahajan & Balasu-bramanian 2003	144 SMEs in the United States n<500	1. Firm Characteristics 2. Competitive Environment 3. Environment Uncertainty 4. Performance Outcomes 5. Size	Adoption & Extent	Survey	Seemingly Unrelated Regression	Most consistent antecedents of e-business adoption: 1. Top management emphasis (support) 2. Organization's learning ability 3. Normative pressures E-business intensity influenced by: 1. Top management emphasis 2. Organizational learning ability 3. Customer orientation 4. Customer power 5. Normative pressures
Zhu, Kraemer & Xu 2002	3100 businesses and 7500 consumers in 8 European countries. Not SMEs.					Four constructs facilitate adoption of e-business: 1.Technology competence (IT Infrastructure, IT Expertise & E-Business Know How) 2. Firm scope and size 3. Consumer readiness 4. Competitive Pressures

In order to illustrate the most consistent facilitators of e-commerce, the results were summarized in Table 2.9.

Table 2.9: Facilitators of adoption/extent of e-commerce

Drivers	Authors	Total Times Cited (Count)
Age of CEO/Top Manager	Ching & Ellis 2004	1
Attitude	Riemenschneider Harrison & Mykytyn 2003	2
CEO/Top Management education/literacy	Konstadakopulos 2006 Lee 2004 Levy & Powell 2003 Looi 2005 Martin & Matlay 2003 Mehrtens, Cragg & Mills 2001 Premkumar & Roberts 1999 Raymond, Bergeron & Blili 2005 Van Akkeren & Cavaye 1999	9
CEO/Top Management innovativeness	Auger & Gallaugher 1997	9
CEO/Top Management support	Grandon & Pearson 2003 Grandon & Pearson 2004a Grandon & Pearson 2004b Levy & Powell 2003 Mehrtens, Cragg & Mills 2001 Mirchandani & Motwani 2001 Poon & Swatman 1997 Poon & Swatman 1999 Premkumar & Roberts 1999 Raymond, Bergeron & Blili 2005	10
Compatibility	Ching & Ellis 2004 Grandon & Pearson 2003 Grandon & Pearson 2004a Lee 2004 Mirchandani & Motwani 2001 Premkumar & Roberts 1999 Sathye & Beal 2001	7
Competitive considerations	Auger & Gallaugher 1997 Daniel & Grimshaw 2002	2
Competitive pressure	Looi 2005 Pflughoeft et al. 2003 Raymond, Bergeron & Blili 2005 Sillence et al. 1998 Wymer & Regan 2005 Zhu, Kraemer & Xu 2002	6
Cost	Auger & Gallaugher 1997 Ching & Ellis 2004	2
Cost	Konstadakopulos 2006 Wymer & Regan 2005	2
Customer pressure	Ching & Ellis 2004 Daniel & Wilson 2002 Houghton & Winklhofer 2004 Wu, Mahajan & Balasubramanian 2003 Zhu, Kraemer & Xu 2002	5

Drivers	Authors	Total Times Cited (Count)
Employee/firm knowledge	Mehrtens, Cragg & Mills 2001 Mirchandani & Motwani 2001 Pflughoeft et al. 2003 Premkumar & Roberts 1999 Tsuja & Nishimura 2002 Wu, Mahajan & Balasubramanian 2003 Zhu, Kraemer & Xu 2002	7
Expand and improve marketing	Auger & Gallaugher 1997 MacGregor & Vrazalic 2004	2
Expansion and/or growth orientation	Auger & Gallaugher 1997 Beck, Wigand & König 2005 Daniel & Wilson 2002 Fomin et al. 2005 Levy & Powell 2003 MacGregor & Vrazalic 2004 Raymond, Bergeron & Blili 2005 Saloheimo 2005 Seyal et al. 2004	9
External pressure	Grandon & Pearson 2003 Grandon & Pearson 2004a Grandon & Pearson 2004b Mehrtens, Cragg & Mills 2001 Premkumar & Roberts 1999 Van Akkeren & Cavaye 1999	6
Financial benefits	Auger & Gallaugher 1997	1
Financial support	Lee 2004	
Government support	Looi 2005 Seyal et al. 2004	2
Image	Levenburg & Magal 2005	1
Improved communication	Auger & Gallaugher 1997 Levenburg & Magal 2005 Sillence et al. 1998	3
Improvement in customer relations	Beck, Wigand & König 2005 Daniel & Grimshaw 2002 Daniel & Wilson 2002 Fomin et al. 2005 Levenburg & Magal 2005 MacGregor & Vrazalic 2004 Saloheimo 2005	7
Improvement in supplies	Beck, Wigand & König 2005 Daniel & Grimshaw 2002 Fomin et al. 2005	5
Increased sales	Fomin et al. 2005 Lee 2004	
IT resources	Mehrtens, Cragg & Mills 2001 Pflughoeft et al. 2003 Zhu, Kraemer & Xu 2002	3
Lack of knowledge/employee knowledge	Van Beveren & Thomson 2002	1

Drivers	Authors	Total Times Cited (Count)
Perceived benefits	Cloete & Courtney 2002 Drennan & Kennedy 2000 Grandon & Pearson 2004 Levenburg & Magal 2005 Levenburg 2005 Mehrtens, Cragg & Mills 2001 Poon & Swatman 1997 Poon & Swatman 1999 Tsuja & Nishimura 2002 Van Akkeren & Cavaye 1999 Wymer & Regan 2005	11
Perceived ease of use	Grandon & Pearson 2003 Grandon & Pearson 2004b Sillence et al. 1998	3
Perceived usefulness	Grandon & Pearson 2003 Grandon & Pearson 2004a Grandon & Pearson 2004b Riemenschneider Harrison & Mykytyn 2003	4
Previous IT benefits	Drennan & Kennedy 2000 Tsuja & Nishimura 2002	2
Reduced costs	Beck, Wigand & König 2005	
Relative advantage	Ching & Ellis 2004 Looi 2005 Mirchandani & Motwani 2001 Premkumar & Roberts 1999 Sathye & Beal 2001	5
Security	Looi 2005	1
Size	Konstadakopulos 2006 Premkumar & Roberts 1999 Van Beveren & Thomson 2002 Zhu, Kraemer & Xu 2002	4
Subjective norm	Riemenschneider Harrison & Mykytyn 2003 Van Akkeren & Cavaye 1999	3
Vendors	Tsuja & Nishimura 2002	1

2.6.9 Facilitators from Category I (Drivers)

A wide range of factors appear to influence SMEs' adoption and sophistication of e-commerce use. The most consistent and often the strongest factor cited in the research is anticipated future benefits or perceived benefits associated with the adoption of e-commerce. Levenburg, Magal and Kosalge (2006) surveyed 439 SMEs in the United States and found that perceived benefits were the main facilitator of adoption and extent. Similar results were found in 108 Canadian SMEs (Raymond, Bergeron & Blili 2005) and in Peru (Tsuja & Nishgimura 2002). Other authors have come to similar findings in various geographical regions such as Australia (Poon & Swatman 1997), Canada (CeBI 2003), New Zealand (Mehrtens, Cragg & Mills 2001), the United Kingdom (Daniel & Grimshaw 2002; Daniel & Wilson 2002), and the United States (Auger & Gallaugher 1997). This construct becomes even more important when looking at the definitions or terms used to describe the other common constructs. As is evident below, perceived benefits could

account for such things as improving the finances of the company, expanding sales, improving marketing and so forth. In fact, of the additional constructs discussed below, all of them except factors that relate to the external environment, the role of top management and the firms' resources could be classified as perceived benefits or anticipated benefits.

Factors related to improving the finances of the company by either expanding sales (Beck, Wigand & König 2005; Fomin et al. 2005; Saloheimo 2005; MacGregor & Vrazalic 2004; Wu, Mahajan & Balasubramanian 2003; Daniel & Wilson 2002; Tsuja & Nishimura 2002; Auger & Gallaugher 1997) and/or reducing costs (Beck, Wigand & König 2005; Daniel & Wilson 2002) are two of the most common motives for adopting e-commerce. Auger and Gallaugher (1997), in a survey of 141 SMEs from several countries, found that a desire to increase sales and achieve financial benefits were the two main drivers of e-commerce adoption. MacGregor and Vrazalic (2004) in a survey of Australian and Swedish SMEs, and Daniel and Wilson (2002) in study on 678 UK SMEs found similar results.

A desire to improve various aspects of marketing has also been identified as a key motivator for SMEs in adopting and or enhancing e-commerce. A key motive is a desire to improve Customer Relations Management (CRM) by enhancing communications, improving the flow of information to customers, and improving customer service (Beck, Wigand & König 2005; Levenburg & Magal 2005; Raymond; Bergeron, Blili 2005; MacGregor & Vrazalic 2004; Daniel & Grimshaw 2002; Daniel & Wilson 2002; Zhu, Kraemer & Xu 2002). Other marketing motives include improving promotions, visibility, and reducing costs (Beck, Wigand & König 2005; MacGregor & Vrazalic 2004; Auger & Gallaugher 1997).

The external environment, whether in the form of competitive or customer pressure, also appears to strongly influence adoption of e-commerce. Looi (2005) surveyed 184 SMEs in Brunei Darussalam where he concluded that competitive pressure was the main driver of e-commerce adoption. In their United Kingdom studies, Daniel and Grimshaw (2002) and Daniel and Wilson (2002), also found the main driver for adopting e-commerce was a desire to remain competitive with peers and larger companies. Pflughoeft et al. (2003), in a US study of 297 SMEs, found that competitive pressure was one of the main facilitators of e-commerce. Other authors (MacGregor & Vrazalic 2004; Zhu, Kraemer & Xu 2002; Auger & Gallaugher 1997) concluded that competitive pressures were an important adoption facilitator, while Ching and Ellis (2004), Houghton and Winklhofer (2004), Wu, Mahajan and Balasubramanian (2003), Daniel and Wilson (2002), Zhu, Kraemer and Xu (2002) found that customer pressure was a significant factor.

The level of support from the owner or top management was also identified as a driver of e-commerce. In order for SMEs to adopt e-commerce, the owner or top management must support the concept (Levy & Powell 2003; Martin & Matlay 2003; Wu, Mahajam & Balasubramanian 2003; Tsuja & Nishimura 2002; Mehrtens, Cragg & Mills 2001). Also related to initial adoption and the intensity of adoption were the owner's attitude toward e-commerce (Raymond, Bergeron & Blili 2005; Levy & Powell 2003; Wu, Mahajam & Balasubramanian 2003) and the owner's knowledge about e-commerce and IT (Konstadakopulos 2006; Raymond, Bergeron & Blili 2005; Lee 2004; Levy & Powell 2003; Martin & Matlay 2003; Mehrtens, Cragg & Mills 2001).

Other drivers of e-commerce identified include a desire to build stronger supplier relations (Beck, Wigand & König 2005; MacGregor & Vrazalic 2004; Daniel & Grimshaw 2002; Daniel & Wilson 2002; Zhu, Kraemer & Xu 2002), improve supply chain management (Houghton & Winklhofer 2004; Wu, Mahajam & Balasubramanian 2003; Daniel & Wilson 2002), employee IT knowledge (Tsuja & Nishimura 2002; Zhu, Kraemer & Xu 2002; Mehrtens, Cragg & Mills 2001), IT infrastructure (Pflughoeft et al. 2003; Zhu, Kraemer & Xu 2002; Mehrtens, Cragg & Mills 2001), scope of operations (Pflughoeft et al. 2003; Zhu, Kraemer & Xu 2002) and the size of the firm with larger firms being more likely to adopt e-commerce (Van Beveren & Thomson 2002; Zhu, Kraemer & Xu 2002).

2.6.10 Facilitators from Category II (Intention models)

As previously indicated in the IT section of the literature review (2.5), there are similarities that exist between certain constructs in various intentions models (Venkatesh et al. 2003; Davis 1989; Rogers 1983). While a discussion about the definitions of the different terms and their similarities occurred in the IT section of this literature review, it would be helpful to briefly mention that similarities exist between the terms relative advantage (Rogers 1983) and perceived usefulness (Davis 1989); complexity (Rogers 1983) and perceived ease of use (Davis 1989); subjective norm and external or customer pressures (Venkatesh & Davis 2000).

Relative advantage (RA) was noted as the most important factor facilitating e-commerce use in Ching and Ellis' (2004) research on 84 SMEs in Hong Kong. Looi (2005) in his research on 184 SMEs in Brunei Darussalam and Saythe and Beal (2001) in their Australian study of 343 SMEs both found that relative advantage was one of the most important constructs in explaining e-commerce adoption. Similar strong support for relative advantage was reported by Mirchandani and Motwani (2001) and Premkumar and Roberts (1999). Grandon and Pearson (2004) used a modified version of TAM in their research and found that perceived usefulness was the most influential facilitator of e-commerce in 100 SMEs in the United States. A number of other studies indicate support for perceived usefulness as a facilitator of e-commerce (Grandon & Pearson 2004, 2003; Riemenschneider, Harrison & Mykytyn 2003; Cloete & Courtney 2002; Riemenschneider & McKinney 2001-02; Poon & Swatman 1999; Van Akkeren & Cavaye 1999).

Compatibility was also acknowledged as important. Both Grandon and Pearson (2003) and Saythe and Beal (2001) found that compatibility was one of the most important factors that influenced e-commerce adoption. Ching and Ellis (2004), Grandon and Pearson (2003, 2004) and Mirchandani and Motwani (2001) also found support for compatibility as a facilitator of e-commerce adoption.

Influence from external sources has also been identified as a driver of e-commerce. External pressure (Grandon & Pearson 2003, 2004), normative beliefs (Riemenschneider, Harrison & Mykytyn 2003; Riemenschneider & McKinney 2001-02), customer pressures (Ching & Ellis 2004) and observability (Saythe & Beal 2001) were all identified as facilitators of e-commerce.

The influence of top management or owners was also identified as a driver of e-commerce. In particular, management support for initially adopting e-commerce or

adopting additional e-commerce technologies was found to be important by Cloete and Courtney (2002), Premkumar and Roberts (1999), Poon and Swatman (1999). Since managers control resources, their support along with their enthusiasm for e-commerce (Mirchandani and Motwani 2001) and their IT knowledge (Poon & Swatman 1999; Premkumar & Roberts 1999) have been positively linked to e-commerce adoption and intensity of adoption.

Other factors identified as facilitators of e-commerce include perceived ease of use (PEOU)/complexity (Grandon & Pearson 2004, 2003) employee knowledge of IT (Mirchandani & Motwani 2001; Premkumar & Roberts 1999), firm resources, also referred to as perceived behavioural control (PBC) (Cloete & Courtney 2002), return on investment (ROI) (Van Akkeren & Cavaye 1999), and size with larger firms being more likely to adopt e-commerce (Riemenschneider & McKinney 2001-02).

It should be noted that there were some conflicting findings surrounding the constructs PEOU/complexity and facilitating conditions/perceived behavioural control. Some authors found that PEOU/complexity was not an important factor, concluding that most SMEs had, at the very least, enough knowledge about e-commerce that PEOU was not a factor (Beck, Wigand and König 2005; Riemenschneider, Harrison & Mykytyn 2003; Saythe & Beal 2001). Perceived behavioural control was found not to be a factor in the research by Riemenschneider, Harrison and Mykytyn (2003). This exclusion was to be expected as the other researchers have found that when PU is included in a model, perceived behavioural control is not a facilitator for intentions to use (Venkatesh et al. 2003).

2.6.11 Summary of e-commerce facilitators

After reviewing the articles on facilitators of e-commerce adoption, a number of drivers stand out as being particularly relevant. In Category I the most prominent factors that emerged were perceived benefits or anticipated benefits associated with the adoption of e-commerce. Additional strong results could be found for a number of factors including a desire to improve the financial condition of the company by increasing sales, reducing costs, and improving marketing efforts – all of which could be classified under perceived or anticipated benefits. SMEs' adoption of e-commerce was also driven by external factors including competitive pressure and customer pressure, and characteristics associated with the ownership or CEO/top management of the company such as support, attitude and knowledge of e-commerce. In Category II the most pertinent facilitators of e-commerce were relative advantage (RA) and perceived usefulness (PU) followed by compatibility, external pressure and characteristics of the owner.

It should be noted that the facilitators found in Category I are closely related to the constructs from Category II. Many if not all, the drivers noted in Category I that are associated with improving the company by increasing sales, reducing costs and/or improving marketing could be categorized as RA or PU. Additionally, external pressures (Category I) and competitive pressures (Category II) are related, as well as ownership characteristics and employee knowledge. Only compatibility, which is a strong facilitator in Category II, cannot be easily identified among the Category I drivers. Prior to drawing any final conclusions about e-commerce facilitators, a review of Canadian research is presented including a discussion on drivers specific to

Canadian SMEs to ensure that any unique geographical, political, cultural and economical facilitators are not omitted.

2.7 Canadian government studies

The Canadian government has identified e-commerce adoption as a priority in building a strong economy. Within Canada, the championing of e-commerce has come from two groups, the first being the Electronic Commerce Branch of Industry Canada, and the second being the Canadian e-Business Initiative (CeBI), a private industry partnership of 200 profit and not-for-profit businesses. These two organizations have worked together to encourage the expansion of the Internet to Canadian businesses and have been responsible for the majority of public reports on e-commerce use by Canadian businesses. Their work has resulted in a series of reports, starting with Fast Forward: Accelerating Canada's Leadership in the Internet Economy (2000) and concluding with Fast Forward 5.0: Making Connectivity Work for Canada (2004), along with a second set of reports on the use of e-commerce by SMEs starting with Net Impact Study Canada: The SME Experience (McClean, Johnston & Wade 2002) and concluding with Net Impact Canada IV: Strategies For Increasing SME Engagement In The E-Economy (2004). In addition to the statistical information compiled on behalf of Industry Canada and the CeBI, Statistics Canada has collected annual information on the use of e-commerce by businesses in Canada in its annual Survey of Electronic Commerce and Technology (SECT 2002, 2003, 2004, 2005, 2006).

As previously indicated in Chapter 1, there are limitations with the data used by CeBI in their research. While these limitations were noted in Chapter 1, they should be mentioned again to provide the necessary background to the discussion on the state of e-commerce in Canada. The Fast Forward (2000, 2.0 2001, 3.0 2002, 4.0 2003) and the Net Impact (McClean, Johnston & Wade 2002; Net Impact Study Canada 2003; CeBI 2003, IV 2004) studies collected primary data from SMEs and relied on three separate data sets. In 2002, 398 SMEs were surveyed followed by focus groups with 56 SMEs in 2003, and finally, a 2004 survey of 952 SMEs split evenly between adopters and non-adopters. The first limitation of the data is the definition of SMEs as businesses with 20 – 499 employees. As the majority of businesses in Canada can be classified as either a micro enterprise with less than five employees, or a small business with 4 – 49 employees (ACOA 2005; Debus 2005; Dulipovici & Kahn 2003), it may be concluded that the majority of SMEs were not considered in these studies. In fact, an analysis of Statistics Canada Business Register indicates that 82.3% of firms have no employees and are sole-operator enterprises (ACOA 2005).

The second limitation deals with the fact that the focus groups only consisted of SMEs that operated in and around Toronto, Ontario. Toronto is the largest city in the country and SMEs in this region would have access to a large population from which to draw customers and workers, significant capital pools, and a high quantity of vendors – all factors that have been cited in other research as either drivers of e-commerce adoption and/or facilitators of e-commerce intensity (Hisrich et al. 2006; Canadian Census Report 2006, 2001; MacGregor & Vrazalic 2004). To provide further clarification of the regional differences in Canada, it can be noted that there are more people in Metropolitan Toronto than there are in the four Atlantic Provinces combined (Canadian Census Report 2006, 2001). Yet the researchers drew national

conclusions from the focus group and used them as a reference point in designing their final survey.

The third limitation is that the respondents, with few exceptions, were answering questions retrospectively. Some researchers have questioned the value of such work (Igabaria 1994; Venkatesh et al. 2003). Finally, all the respondents are self-reporting their usage. Again this is a common practice in IT/e-commerce research as illustrated in the research conducted by MacGregor and Vrazalic (2004). Blair and Burton (1987) concluded that self-reported data is an appropriate measure. However, other researchers such as Igabaria (1994) and Venkatesh et al. (2003) have raised concerns about the reliability of self-reported data (Taylor & Todd 1995a, 1995b).

In addition to the limitations of the CeBI studies, the research carried out by Statistics Canada is problematic. The annual Survey of Electroinc Commerce Technologies (SECT) is conducted on approximately 21,000 service/retail businesses but the survey does not include businesses with revenue less than $150,000 - $250,000 for manufacturing businesses. As many of the micro enterprises and small businesses in Canada, particularly those in Atlantic Canada, report income levels well below this threshold, they are not in the SECT data (ACOA 2005). In addition, the full reports are not publicly available and the general public and researchers must gather information from small published excerpts that leave many unanswered questions.

It should also be noted that the studies use different terms and definitions on their surveys and reports which may lead to difficulty in drawing conclusions. Statistics Canada defined SMEs as companies with between 20 and 499 employees with a minimum revenue of $150,000 - $250,000. Statistics Canada also recognizes that there are different sized SMEs and within their research note that 'small' SMEs have fewer than 20 employees, 'medium' SMEs have fewer than 100, and 'large' SMEs have between 101 – 499 employees. The two groups also use different terms in their surveys. Industry Canada used IBS (see Definitions 1.6) which is a very broad based term that refers to almost any type of electronic transaction, including transactions that do not use the Internet. Statistics Canada uses the term e-commerce and, while their definition of the term goes beyond just the buying and selling of goods, the Internet must be used in the business process or transaction to fit in their definition. Thus, there are expected to be some differences in the reports on the state of e-commerce in SMEs. However, the differences are, in fact, larger than expected (see below). The statistics provided by Industry Canada/CeBI perhaps should be examined in the light that one of their major initiatives was to promote e-commerce in SMEs and many of their metrics measuring the success of CeBI's work revolved around whether they achieved this in the five years that the group existed. Statistics Canada's role is to produce statistics on the country's people, business, and communities.

2.7.1 State of e-commerce in Canadian SMEs

Originally, the use of e-commerce by SMEs in Canada was categorized as 'promising' by government sources, as businesses were quick to adopt basic Internet technologies such as e-mail and/or information searches via the Internet. These facts, combined with Canada's high level of household connectivity, 76% (highest globally per capita) and the significant infrastructure investment by the government,

led researchers to believe that SMEs and Canadians would embrace the Internet (Fast Forward 5.0 2004; Johnston, McClean & Wade 2004). The consensus finding in all the Canadian government studies is that e-commerce adoption peaked somewhere between 2000 and 2001 (CeBI 2003; McClean, Johnston & Wade 2003) and stalled as of 2003. In 2003, 70% to 85% of SMEs reported having Internet access but only 35% to 50% made use of basic Internet technologies such as having a webpage or providing minimal online customer service (Noce & Peters 2005; Fast Forward 5.0 2004; Johnston, McClean & Wade 2004). In addition, findings indicate that of the SMEs that have adopted Internet technologies, the majority have only adopted the most basic technologies. Since research has indicated that the benefits increase with increased sophistication of technologies used, studies have concluded that SMEs are not realizing the full potential of the Internet (Beck, Wigand & König, 2005; Fast Forward 5.0 2004). Furthermore, of the SMEs that have adopted Internet technologies, the majority have no near term intentions to expand beyond the basics (89%) and the majority of non-adopters have no short range plans to adopt (90%). One reason cited to explain the slow adoption of e-commerce by SMEs is Canadian consumers, who have been much slower than their American counterparts to purchase goods and services online (17% vs. 27%) (Fast Forward 5.0 2004; Johnston, McClean & Wade 2004). While e-commerce sales have grown to $28 billion as of 2005, it still represents less than 1% of annual consumer purchases (Fast Forward 5.0 2004).

These conclusions of a 'stalled' e-economy receive support from a number of other studies that found that Canada's high level of connectivity has not resulted in an increased use of e-commerce. For example, the Office of the e-Envoy, Country Report, *The Canadian e-Economy* (2003) stated that the high level of Canadian consumer acceptance and access to the Internet has not translated into increased e-commerce, while *The 2004 e-Readiness Ranking Report* ranked Canada 11th out of 64 countries down from a 4th in 2001.

The actual use of the Internet by SMEs in Canada could appear much lower considering that all the studies precluded small or micro firms either by not including them because they did not have enough employees (n>20) or by establishing revenue minimums ($150,0000). Canadian studies have indicated that even among SMEs, smaller SMEs are less likely to adopt Internet technologies. Thus the actual statistics discussed in this section would be much lower if smaller companies were included. This aspect may be particularly troubling to the government as the majority of SMEs in Canada can be categorized as small or micro-enterprises (ACOA 2005).

Depending on the government source, whether it is work completed by CeBI or research published by Statistics Canada there are differences between the published findings due to the reasons previously given. The Fast Forward and Net Impact series all published by CeBI concluded that 50% of SMEs have adopted Internet Business Solutions (IBS) and 50% have not; of the 50% that have not adopted 28% have no intention to adopt. Furthermore, among the non-adopters that would consider adopting, most are not likely to do so in the near future. Fast Forward 5.0 (2004) and Net Impact IV (2004) both cite the following statistics (Table 2.10) to describe the adoption and sophistication of adoption among Canadian SMEs.

Table 2.10: SMEs IBS Use by Adopters (%)

Online Internal Operations (e-mail)	64.4
Online Marketing	60.9
Online Purchasing	51.3
Online Customer Service	48.2
Online Sales	42.9
Source: Fast Forward 5.0 2004; Johnston, McClean & Wade 2004	

Work by Statistics Canada has been disseminated in a number of public releases and in some commissioned studies. Their findings do not separate adopters from non-adopters. The most recent work has found that only 7.3% of firms (including large businesses) sell goods online and that only 36.8% actually have an online presence. Statistics Canada released the following information (Table 2.11) from the 2004 SECT to describe the state of e-commerce adoption in Canada.

Table 2.11: Internet Use in Canada

Internet Technology	Small Firms		Medium Firms		Large Firms		All Firms		
	2003	2004	2003	2004	2003	2004	2002	2003	2004
Internet Access	75.9	79.3	93.7	96.1	97.2	98.5	75.7	78.3	81.6
Website Presence	29	31.6	66.1	68.9	77.2	79.4	31.5	34.1	36.8
Purchasing Online	35.1	39.9	50.1	58.7	60.5	62.2	31.7	42.5	43.4
Selling Online	6.0	6.7	14.2	11.9	15.5	12.8	7.5	7.1	7.3
Source: Statistics Canada 2004 SECT									

Further insight into these results can be found in the study published by Peters and Noce (2005) based on the same data set. They found that as of 2004, 74% of the firms with Internet access used email and of the 34% of firms that had a website, only 26% had interactive capabilities. Furthermore, they found that only 6% of firms made use of extranets which facilitate the external sharing of information by company employees (Noce & Peters 2005).

Therefore, even with the differences between the data sets, both sets of statistics offer support for the conclusion that SMEs' adoption of e-commerce in Canada has, in fact, stalled. SMEs' use does not extend beyond that of basic technologies. It would make sense to examine the current users to see if they are benefiting from the adoption of the technology to determine if their use has resulted in the same benefits discussed in Section 2.6.6.

While the adoption rates and the sophistication of adoption have stalled in Canada, it has done so in spite of strong results from current users. In Net Impact IV (2004), 62.2% of SMEs that adopted are either satisfied or very satisfied, with only 9.9% expressing any level of dissatisfaction. Firms reported that using Internet technologies resulted in an increase in revenue of 7%, a decrease in cost of goods sold of 9.5%, and sales and administration costs of 7.5%. In addition, firms noted that the use of the Internet improved customer service, communications, competitive advantage, and marketing, and improved the efficiency of their operations (Net

Impact 2006; Fast Forward 5.0 2004). Therefore, it can be concluded that Internet technology adoption, even at the more basic level, results in strong results. These findings are similar to global studies discussed in Section 2.6.6. With firms not adopting in the face of compelling evidence, it makes sense to review the drivers and barriers of e-commerce adoption to see if they differ from studies in other countries and to gain further insight into what can be done to increase adoption.

In Canada, the most consistent driver/facilitator of Internet technology was perceived future benefits. In Industry Canada's final Net Impact study (Johnston, McClean & Wade 2004), they concluded that one of the two main drivers was a desire to increase revenue. Similar results were found by Peters and Noce (2005) in their review of the 2004 SECT survey completed by Statistics Canada and in Net Impact III (2003). Other drivers identified did not necessarily mention 'revenue,' but all would have a positive impact on the companies' income statements. These revenue related drivers include increased sales (CeBI 2003; Fast Forward 3.0 2002, 4.0 2003, 5.0 2004), reduced costs (CeBI 2003; Fast Forward 3.0 2002, 4.0 2003, 5.0 2004), improved marketing (Johnston, McClean & Wade 2004; CeBI 2003), and improved response to customers (Johnston, McClean & Wade 2004, CeBI 2003; Fast Forward 4.0 2003, 5.0 2004). The other major driver was a desire to keep up with the competition (Johnston, McClean & Wade 2004; Fast Forward 5.0 2004). Additional drivers included a desire to improve communication (Fast Forward 3.0 2002, 4.0 2003, 5.0 2004) and that the Internet was compatible to their existing IT (CeBI 2003).

The majority of the work that identified drivers of e-commerce adoption was done so retrospectively. The only exception to this would be the final survey for Net Impact IV (2004) in which both adopters and non-adopters were surveyed. Typically, the research is asking SMEs to recall their thoughts on decisions that may have been made some time ago and this may not reflect the actual adoption decision process. This use of retrospective questioning has led some researchers to question the accuracy of findings when this type of questioning is employed (Venkatesh et al. 2003; Plouffe, Hulland & Vandenbosch 2001; Taylor & Todd 1995a, 1995b).

The main barrier to adoption was the perception by decision makers (owners) that IBS did not offer their firms any benefits. Net Impact IV (2004) stated that among non-adopters, 50% of them did not see any benefit to adopting IBS. Furthermore, Net Impact IV concluded that among firms that adopted the most basic level of technology, they saw no benefits associated with increasing the sophistication of their adoption. Peters and Noce (2005) and Statistics Canada's 2002 E-Business Report came to similar conclusions that SMEs' owners (adopters and non-adopters) do not see their company benefiting from sophisticated use of e-commerce. Other barriers include SMEs not wanting to change their business models (Noce & Peters 2005), lack of external assistance (Fast Forward 5.0 2004; Johnston, McClean & Wade 2004; CeBI 2003), lack of time (Fast Forward 5.0 2004; E-Business Report 2002), lack of skills (CeBI 2003; E-Business Report 2002), and the sense that customers do not want to use the Internet (E-Business Report 2002; Johnston, McClean & Wade 2004). It should be noted that 'cost' was not identified as a significant barrier in any of the studies (Noce & Peters 2005; Fast Forward 5.0 2004; Johnston, McClean & Wade 2004).

2.7.2 Summary of Canadian Research on SMEs adoption of e-commerce

After reviewing the state of e-commerce in Canada, specifically as it pertains to SMEs, there is little doubt that the growth of the technology has stalled. For many SMEs, the owner who usually makes the adoption decision (CeBI 2003) does not see any benefit to either adopting or increasing the sophistication of the adoption. This decision not to adopt or expand appears to be done in contradiction to evidence that suggests if SMEs were to adopt they would benefit. The main facilitators of adoption are the desire to achieve future benefit from adoption while the main barrier is the owner's perception that adoption will not be useful.

The studies are limited due to problems stated above and more research needs to be undertaken on smaller SMEs in order to draw final conclusions. Since the focus of this study is on SMEs, Atlantic Canadian studies on this specific area will be addressed to see if they add or detract from these conclusions.

2.8 Atlantic Canadian SMEs

There is only one study completed by the government that deals specifically with e-commerce adoption in Atlantic Canada. The study has several limitations including its age (2000), limited sample size (138), and that it only dealt with businesses that had an Internet connection (The State of Electronic Commerce in Atlantic Canada 2000). Thus a firm had to at least have had access to the Internet in order to participate. The findings indicated that the majority of firms were only using the Internet for basic communication purposes and web browsing, and few firms were engaging in any level of online sales. While the study is dated, it does indicate that Atlantic Canadian firms, even at that time, trailed the rest of the country in the adoption of e-commerce. Subsequent to this study, Mombourquette (2007) completed case study research with ten Atlantic Canadian tourism operators. He concluded that tourism oprators have yet to adopt sophisticated e-commerce technologies and are failing to do so due to their lack of understanding of e-commerce benefits. Mombourquette's research is limited by his small sample size and his focus on the tourism industry. Prior to summarizing the research in this chapter, the literature review will discuss Canada and the Atlantic Canadian region to put the area of the study into context and to identify any unique characteristics of the Atlantic Canadian region.

2.9 The Canadian and Regional Context

This section of the literature review will provide some information on Canada, the country where the study occurs, then discuss some of the unique features of Atlantic Canada, the region where the study is focused. In addition to discussing basic demographic information, the segment will highlight the importance of SMEs to the Canadian and Atlantic Canadian economy and provide some contextual information on why the Atlantic Canadian region is unique within the country. Since the primary goal of the dissertation is to explain future adoption intentions of e-commerce by Atlantic Canadian SMEs, it makes sense to provide information on the region. Also, the use of regionally focused research has been determined to offer the most potential benefits to the specific region (Nauwelaers & Wintjes 2002; Todtling & Kaufman 2001; Cecora 2000).

Canada is a developed country and one of the world's wealthiest nations (Wallace 2002; Howlett & Ramesh 1992). Canada consists of 32,878,900 people spread out over 9,984,670 square kilometers (Canadian Census 2006, 2001). The population of the country is relatively small compared to its land mass which makes it the second largest country in the world. Canada consists of ten provinces (see Table 2.12) and three territories, although provinces are often described as belonging to regions that share similar social, cultural and economic attributes (see Table 2.13). Canada has a free market economy that is dominated by the service industry, although primary resources such as oil, nickel, and logging are also prominent. Canada is also heavily dependent on International trade with the United States, as they purchase roughly 85% of Canadian exports and provide approximately 58% of Canada's imports (Wallace 2002; Desjardins, Hobson & Savoie 2000; Howlett & Ramesh 1992).

Canada was originally founded as an economic union between four provinces: Ontario, Quebec, New Brunswick and Nova Scotia, in 1867. Since that time other provinces have joined Confederation, with the last being Newfoundland in 1949 (Edbert, Griffin & Starke 2006; Wallace 2002). The country has been shaped by a number of political leaders that believed in a strong Federal government along with a concept of equality in social services throughout the country. The result of this equality in social services has resulted in the Federal government maintaining the majority of taxing power and redistributing wealth from richer or 'have' provinces to poorer or 'have not' provinces under an equalization program. Desjardins, Hobson and Savoie (2000) note that economic disparity between the provinces and territories is one of the defining characteristics of the country.

Table 2.12: Canadian Provinces

Canadian Provinces	Canadian Territories
Alberta	North West Territories
British Columbia	Nunavut
Manitoba	Yukon
New Brunswick	
Newfoundland	
Nova Scotia	
Ontario	
Prince Edward Island (PEI)	
Quebec	
Saskatchewan	

Table 2.13: Regions in Canada and their Characteristics

Canadian Regions	Provinces within Regions	Characteristics
Atlantic Canada	New Brunswick, Newfoundland, Nova Scotia, PEI	Mostly rural region, considered to be a 'have not' area of the country. Major economic indicators such unemployment rate, GDP and household income have historically trailed provincial and national averages.
Central Canada	Ontario, Quebec	Urban region, as the name suggests, located in the centre of the country. Economic centre of Canada with majority of manufacturing jobs and corporate offices. Ontario has long been the richest province. Quebec is currently considered a 'have not' province, although historically this has not been the case.
Prairie Provinces	Saskatchewan, Manitoba	Rural provinces, economies focused on farming. Considered to be 'have not' provinces.
Alberta	Referred to separately	Resource rich province. Known for vast oil deposits which are owned by the provinces in Canada. Oil reserves are considered to be one of the richest in the world. Alberta is the wealthiest province.
British Colombia	Referred to separately	Located on the Pacific Ocean. Known for service and trade industry. Considered to be a 'have' province.
Territories	North West Territories, Nunavut, Yukon	Sparsely populated areas of the country with many developing mineral projects including oil, gold, diamonds and timber. Considered to be a 'have not' region.
Source: ShiftCentral 2003; Wallace 2002; Desjardins, Hobson and Savoie 2000		

2.9.1 Importance of SMEs to the Canadian Economy

The majority of businesses in Canada can be classified as SMEs. The Canadian Federation of Independent Businesses (CFIB) has found that over 99% of businesses in Canada can be classified as SMEs with fewer than 500 employees (Debus 2005; Dulipovici & Kahn 2003). Of the businesses in Canada, 97% are small firms with less than 20 employees and the majority of these small firms have no employees. These results have led CFIB to proclaim that most Canadian businesses are very small. CFIB found that SMEs account for 56% of the jobs in Canada, for over half of the annual job growth, contribute significantly to GDP growth, and lead the country in the development of innovations. Further support for the importance of SMEs to the Canadian economy can be found in work published by Statistics Canada, who concluded that 75% of businesses in Canada had less than five employees and 99% of businesses employed less than 100 people (Debus 2005; Dulipovici & Kahn 2003). Having provided some background information on Canada and the importance of SMEs, the paper will now discuss the Atlantic Canadian region and the impact of SMEs on the economy.

2.9.2 Atlantic Canada

The Atlantic Canadian region consists of four provinces that are located on the east coast of Canada. Newfoundland and Prince Edward Island (PEI) are islands on the Atlantic Ocean, Nova Scotia is a peninsula, and New Brunswick is on the coast but remains part of the mainland (Wallace 2002). The provinces share many characteristics, including their closeness to the ocean, which results in their being classified into the same region (Rise of Cities 2006; Economic Transformation 2005). In comparison to other parts of the country, Atlantic Canada's population is relatively small, making up only 8% of Canada's population (see Table 2.14), it is more rural, with 46% of Atlantic Canadians residing in rural areas, compared with 20% nationally, and it has a more homogeneous population than the rest of the country (ShiftCentral 2003).

Table 2.14: Breakdown of Atlantic Canada's Population

Atlantic Provinces	Population	Rural Population as a percentage of total
Newfoundland	512,930	42.3
New Brunswick	729,500	55.2
Nova Scotia	908,005	44.2
PEI	135,290	49.6
Source: ACOAin Canada 2005		

The region's population is both declining and aging and many of the regions' educated youth between the ages of 20 – 29 are leaving to find work in other provinces a phenonoman referred to as outmigration (Where have all the workers gone? 2007; ACOA 2005). As a result of this decline in population and outmigration of youth, all four provincial governments, in cooperation with the Atlantic Institute of Market studies, an Atlantic Canadian Think-tank, have concluded that the region will suffer severe labour shortages in coming decades (Economic Transformation

2007; Where have all the workers gone? 2007; ShiftCentral 2003). These problems are further exacerbated by the region's inability to attract immigrants. Over the course of the 1990s, Atlantic Canada only attracted 12,500 immigrants. This lack of immigrants is evident in the makeup of the population in urban areas where immigrants and non-permanent residents account for less than 5% of the population, compared to 18.8% for Canada (ShiftCentral 2003). The numbers are assumed to be much lower for rural areas in the Atlantic provinces. Culturally, the region is known for the friendliness of its people, low crime rates, a lifestyle that is more relaxed in comparison to larger provinces, and strong ties between people and their communities. Canadians, Atlantic Canadians in particular, are more likely to maintain their residency in areas that lack economic opportunity rather than move.

Economically, the region is considered to be poor in comparison to the other provinces. Desjardins, Hobson and Savoie (2000) completed a study of historic and current data on GDP per capita, GDP per worker, unemployment rates, and labour force participation rates. They found that the region fell significantly short of provincial and national averages. Support for these assertions can be found in the following tables that have been published by Statistics Canada. Table 2.15 clearly illustrates that unemployment rates fall below national averages. Furthermore, the provincial governments suffer from high per capita debt levels and maintain some of the highest provincial tax rates in the country (ShiftCentral 2003; Desjardins, Hobson & Savoie 2000).

Table 2.15: Unemployment Rates for Atlantic Canada

Atlantic Provinces	Unemployment Rates – 2007	2001	1994	1991
Newfoundland	14.8	21.8	20.4	27.8
New Brunswick	11.0	12.5	12.4	15.4
Nova Scotia	7.9	10.9	13.3	12.7
PEI	8.8	13.2	17.1	13.5
Canada	6.3	7.4	10.4	10.2
Source: Statistics Canada 2007				

While the region has areas that are challenged economically, there are areas within Atlantic Canada that are experiencing strong economic growth. Major urban areas in this region have much lower unemployment rates than other parts of the Atlantic Provinces. They often serve as economic hubs in their respective provinces and so they have experienced moderate to strong economic growth between 1990 and 2007. Politicians in all four provinces have commented that the region actually has two separate economies – a thriving urban economy and a much poorer rural economy. Urban areas are bolstered by the influx of young, educated workers from within the region, strong service businesses, and resurgence in the primary resources industry that includes major oil and gas developments off the coasts of Newfoundland and, to a lesser extent, Nova Scotia. Onshore oil and gas in both New Brunswick and Nova Scotia, and improving markets in fishery, agriculture and lumber have also experienced recent growth.

2.9.3 Importance of SMEs to the Atlantic Canadian Economy

The Atlantic Canadian economy is dominated by SMEs. Of the four provinces in the region, SMEs with fewer than 500 employees make up 99.9% of businesses in New Brunswick and PEI, and 99.8% of businesses in Nova Scotia and Newfoundland. Most of these businesses are small, with no paid employees on payroll, and operate as sole proprietorships (Bourgeois 2006a, 2006b, 2006c, 2006d; ACOA 2005). See Table 2.16 for a summary of sizes of SMEs in Atlantic Canada.

Table 2.16: Atlantic Canada's Small and Mid-sized Business Sector (%)

Region	Business with no payroll employees	Fewer than 5 employees	5-19 employees	20-49 employees	50-499 employees	500 employees or more
New Brunswick	42.6	33.5	16.6	4.7	2.5	0.1
Newfoundland & Labrador	36.6	38.1	18.1	4.5	2.5	0.2
Nova Scotia	44.4	30.8	16.9	4.9	2.9	0.2
Prince Edward Island	38.1	34.2	19.7	5.4	2.5	0.1
Source: Bourgeois 2006a, 2006b, 2006c, 2006d						

In addition to making up the majority of businesses in the region, SMEs are also the main employer. In PEI, SMEs employ 58% of the workforce, 53% in Nova Scotia, 52% in New Brunswick, and 51% in Newfoundland (Bourgeois 2006a, 2006b, 2006c, 2006d). In addition to being the region's main employer (Table 2.17), SMEs account for the majority of GDP in the region, invest a greater proportion of their resources in Research and Development compared to larger firms, and, as a result, are significant innovators and account for the majority of exports in Atlantic Canada (Bourgeois 2006a, 2006b, 2006c, 2006d) (see Table 2.18).

Table 2.17: Percentage of Workers Employed by SMEs in Atlantic Canada

Region	Small Businesses (less than 200 employees)	Mid-sized Businesses (less than 500 employees)	Large Businesses (500+ employees)
New Brunswick	33	19	48
Newfoundland & Labrador	33	18	49
Nova Scotia	30	23	47
Prince Edward Island	33	25	42
Source: Bourgeois 2006a, 2006b, 2006c, 2006d			

Table 2.18: Percentage Exports by SMEs in Atlantic Canada

Region	Fewer than 50 employees	50-99 employees	100-499 employees	500 or more employees
New Brunswick	51	13	23	14
Newfoundland & Labrador	16	8	30	46
Nova Scotia	25	14	29	33
Prince Edward Island	37	10	53	no data
Source: Bourgeois 2006 a, 2006b, 2006c, 2006d				

SMEs in Atlantic Canada face challenges that are unique to their region, including a lack of investment dollars, smaller markets, and increased red tape or bureaucracy. Additionally, they are geographically farther from large American markets compared to firms in Central Canada, and have an aging and declining population which limits their ability to staff key positions, including IT specialists (Rise of Cities 2006; Economic Transformation 2005; ShiftCentral 2003).

2.9.4 Summary of the Canadian and Atlantic Canadian Context

As is evident above, SMEs play a vital role in the Canadian economy, specifically in the Atlantic Canadian region. The Atlantic Canadian region is also a distinct part of Canada, as indicated by the area's distinctive cultural, geographical, and economic characteristics. These characteristics will be taken into consideration, along with facilitators of e-commerce and IT previously discussed in this chapter, and the unique characteristics of SMEs to formulate a preliminary model in the next section that will explain SMEs' intentions to initially adopt or adopt additional e-commerce technologies.

2.10 Construction of a Preliminary Model to explain Behavourial Intentions to adopt e-commerce

As stated in Chapter 1, the main research problem or question in this dissertation is to explain the variance among SMEs in their intentions to adopt e-commerce or to adopt more sophisticated e-commerce than they currently use. Additionally, the researcher would like to see whether the behavioural intentions model will explain the variance in current usage, and gain some insight into the use of e-commerce by Atlantic Canadian SMEs. The preliminary model expressed below will focus on explaining the variance in intentions to adopt or increase the intensity of e-commerce adoption among SMEs. In addition, the model will be tested to see whether or not it can explain the current state of e-commerce adoption and to provide insight into the perceptions of SMEs about e-commerce.

The literature reviewed in this chapter began with studies on the adoption of innovations by organizations and moved to specific studies that concentrated on the adoption of IT by SMEs, the adoption of e-commerce by SMEs, and finally, to the adoption of e-commerce by Canadian SMEs, specifically Atlantic Canadian SMEs. Additionally, this chapter discussed the differences between SMEs and large businesses and reviewed the unique characteristics of the Atlantic Canadian region. When reviewing the facilitators of adoption in all of the studies, whether in

innovation, IT or e-commerce research, several sets of factors stand out for their consistent and significant influence in explaining behavioural intentions to adopt. See Table 2.19 for a summary of the most consistent and significant factors.

Table 2.19: Summary of research from the literature review of factors that influence adoption decisions

Type of Research Examined	Facilitators of Intention to Adopt	Most consistent and significant facilitators identified in the research
Canadian e-commerce research	Desire to keep up with competition Desire to increase revenue Increase sales Improve marketing Perceived future benefits Reduce costs	Increase sales Reduce costs Perceived future benefit Desire to increase revenue
E-commerce research on SMEs	CEO/Top Management literacy and/or knowledge CEO/Top Management support Compatibility Employee knowledge External Factors including competitive and customer pressure Improve marketing Improve the financial condition of the company Increase sales Perceived benefits Perceived usefulness Reduce costs Relative advantage	CEO/Top Management literacy and/or knowledge CEO/Top Management Support Compatibility Employee knowledge External Factors Perceived benefits Relative advantage/perceived usefulness
Innovation & Behavioural Intentions Research	Attitude Compatibility Complexity Ease of use Perceived Behavioural Control Perceived Usefulness Relative Advantage Subjective norm	Attitude Compatibility Complexity Ease of use Perceived Behavioural Control Perceived Usefulness Relative Advantage Subjective norm
IT research on SMEs	CEO/Top management innovativeness CEO/Top management literacy/knowledge CEO/Top management support Ease of use Employee knowledge External environment External support Perceived benefits (perceived usefulness & relative advantage) Size of the business	CEO/Top management innovativeness CEO/Top management literacy/knowledge CEO/Top management support Ease of use Employee knowledge External environment External support Perceived benefits (perceived usefulness & relative advantage) Size of the business

When reviewing the above table, several factors emerge as constructs to be considered in a preliminary model, as they are evident in all bodies of research and are the most consistent and strongest facilitators of adoption or the intention to adopt. As many of these factors refer to the same construct, albeit with the use of different labels (Wymer & Regan 2005; Venkatesh et al. 2003; Taylor & Todd 1995a, 1995b; Rogers 1985), the list was reduced to avoid redundancy and to produce a parsimonious model.

During the reduction stage, all facilitators that dealt with future benefits, including attitude, perception of benefits, perceived usefulness, and relative advantage, were combined into one term - perceived benefits. This is justified by researchers such as Venkatesh et al. (2003), Talyor and Todd (1995a,b) and Rogers (1995) who found that the terms are similar and refer to the same set of beliefs. Research also indicates that ease of use and complexity refer to the same construct (Venkatesh et al. 2003; Plouffe, Hulland & Vandenbosch 2001), and that subjective norm and external environment are closely related (Taylor & Todd 1995a, 1995b; Thompson, Higgins & Howell 1991). This reduction of redundant constructs left 11 potential factors to be considered for the model.

The factors can be further broken down into two categories: those that are specific to the innovation and those that are specific to the firm. In search of a more parsimonious model, the remaining factors were further analyzed, taking into consideration research already discussed in the literature review. See Table 2.20 for a summary of the reduced list of facilitators and the categorization of the potential constructs.

Table 2.20: Summary of main drivers and the resulting reduced list of facilitators

Main facilitators of IT identified in research	Reduced list of facilitators	Specific to the innovation	Specific to the firm
Attitude CEO/Top management innovativeness CEO/Top Management literacy and/or knowledge CEO/Top Management support Compatibility Complexity Ease of use Employee knowledge External environment External Factors External support Increase sales Reduce costs Perceived Behavioural Control Perceived benefits Perceived benefits (perceived usefulness & relative advantage) Perceived future benefit Desire to increase revenue Perceived Usefulness Relative Advantage Relative advantage/perceived usefulness Size of the business Subjective norm	CEO/Top management innovativeness CEO/Top Management literacy and/or knowledge CEO/Top Management support Compatibility Ease of Use Employee knowledge Perceived Behavioural Control Perceived benefits Size of the business Subjective norm External support	Compatibility Ease of Use Perceived Behavioural Control Perceived benefits Subjective norm	CEO/Top management innovativeness CEO/Top Management literacy and/or knowledge CEO/Top Management support Employee knowledge External support Size of the business

When reviewing the list of potential constructs for a preliminary model, it is also important to consider aspects that are unique to SMEs and the Atlantic Canadian business community. Table 2.21 summarizes these aspects.

Table 2.21: Summary of contextual factors that influence adoption decisions

Context	Factors that influence adoption decisions
SME research	Employ generalist not specialists Highly centralized structure Lack of financial resources Top management are the main decision makers
Atlantic Canadian	Economy is poor compared to the rest of the country Firms are smaller Lack financial resources Lack of IT specialists Population is small, aging and declining Rural (46%)

2.10.1 Factors Specific to e-commerce that are included in the Preliminary Model

Of these potential constructs (See Tables 2.20 and 2.21), the most compelling case can be made for the relationship between adoption and perceived future benefits that will result from such an adoption. This future benefits construct is found in all bodies of research, though sometimes the term used to describe the construct is labeled differently. The most common names are relative advantage, perceived usefulness or perceived benefits. Further evidence in support of such a construct can be found in examining other identified facilitators such as a desire to improve sales or to decrease costs. Such outcomes are, in fact, desired or perceived future benefits.

The construct ease of use is one that has resulted in mixed results in e-commerce and IT research. As previously stated Thong (1999) found that it impacted initial adoption but_failed to impact the extent of adoption. Other researchers such as Grandon and Pearson (2003, 2004b) and Igbaria et al. (1997) found support for the ease of use construct in their research. Plouffe, Hulland and Vandenbosch (2001) found no support for the impact of ease of use or complexity. Thong (1999) and Plouffe, Hulland and Vandenbosch (2001) completed research on relatively simple technologies so this is not entirely unexpected. When looking at the Atlantic Canadian region and SME characteristics, it makes sense to include ease of use in the model. Atlantic Canada's population is aging and the majority of businesses are owned by people over the age of 45 (ACOA 2005). Furthermore, these businesses do not employ IT specialists and there is a lack of specialists in the region. Prior research supports the notion that ease of use or complexity of a technology is a more significant factor for older people (Venkatesh et al. 2003; Morris & Venkatesh 2000). Since the study is focusing on the adoption of sophisticated technologies, ease of use should be given greater consideration.

Subjective norm is a term that is often labeled as external influence or social norms. While different labels exist, the definitions of the constructs contain the explicit or implied view that a person's behaviour (adoption) is influenced by how others will view their behaviour (Venkatesh et al. 2003). Strong support for the inclusion of

subjective norm can be found in the behavioural intentions research (Taylor & Todd 1995a, 1995b; Thompson, Higgins & Howell 1991), in IT (Harrison, Mykytyn & Riemenschneider 1997; Iacovou, Benbasat & Dexter 1995), and in e-commerce research (Raymond, Bergeron & Blili 2005; Riemenschneider, Harrison & Mykytyn 2003). As indicated in the e-commerce and IT sections, not all research supports the inclusion of subjective norm as a facilitator of e-commerce (Lee 2004) or IT (DeLone 1988). Theoretically, as indicated above and in previous sections of the literature review, the use of subjective norm or external influence is justifiable as a construct. Further support can be found when considering SMEs as the target population and the context of the Atlantic Canadian region. Research conducted by French and Raven (1959) and Warshaw (1980) found that individuals are most likely to comply with the expectations of others if they will receive a reward for such compliance. Customers have an ability to reward SMEs, thus their influence on the adoption should be significant. Prior research by Iacovou, Benbasat and Dexter (1995) support the assertion. In addition, research has indicated that affiliation needs increase with age (Venkatesh et al. 2003) and as the Atlantic Canadian region is aging, one would assume that older managers/owners will put more emphasis on social influences.

Therefore, the model will include three factors that have been classified as specific to the innovation itself. These are factors that relate to perceived future benefits, ease of use and subjective norm/external environment. As stated above, numerous researchers use different labels to describe the constructs that capture similar elements. Since a unified model (UTAUT), which was previously discussed in this chapter, was developed to combine the above constructs, the labels and definitions will be adopted for the preliminary model. The constructs from the unified model are stated in Table 2.22 along with the definitions that will be used in this research.

Table 2.22: Constructs adopted from the UTAUT model and their adapted definitions for this dissertation

UTAUT Constructs & Definitions	Preliminary Model Constructs and Definitions
Performance Expectancy - the degree to which an individual believes that using the system will help him or her to attain gains in job performance	Performance Expectancy - the degree to which an individual believes that using e-commerce will help him or her to attain gains for their business
Effort Expectancy – the degree of ease associated with the use of the system	Effort Expectancy – the degree of ease associated with the use of the system
Social Influence - the degree to which an individual perceives that important others believe he/she should use the new system	Social Influence - the degree to which an individual perceives that important others believe he/she should use e-commerce

2.10.2 Factors specific to the firm that are included in the Preliminary Model

A great deal of support can be found for the role that the CEO/top manager plays in the adoption process. Rogers (1995) found that a positive attitude toward change by leaders improved the adoption of an innovation. Further research on IT (Premkumar (2003; Proudlock, Phelps & Gamble 1999) and e-commerce (Konstadakopulos 2006;

Lee 2004) adoption found consistent and significant support for the role of the CEO/top manager in the adoption process. This research is supported by what is known about SMEs' characteristics, including that Canadian SMEs are small, often with no employees, that the owner-manager or top manager makes almost all of the decisions, and that they do not have access to or ask for outside professional advice. Thus top management or a lone owner/manager usually makes all important decisions, including those that allocate resources.

Research has indicated that some people are naturally more inclined to be innovators (Kirton 1976) and innovators are more apt to be innovation oriented (Barba-Sánchez, Martínez-Ruiz & Jiménez-Zarco 2007; Singuaw, Simpson & Enz 2006; Worren, Morre & Carmona 2002). Thus an innovative owner/manager would be more likely to seek innovative or new solutions such as the adoption of IT. As stated by Abdullah (2002) and Thong (1999), investment in IT involves risk and only an innovative owner/top manager would be willing to invest resources. Therefore the CEO/top management innovativeness is included as one of the constructs in the model and defined as: *'the CEO/Top Management's interest in, willingness to try and experiment with new technologies'.*

Strong support can be found for the inclusion of CEO/top management literacy and/or knowledge and its subsequent positive or negative influence on adoption. Since the CEO/top manager is the lone decision maker, often the only employee, most likely in a firm that lacks employees with IT knowledge, and does not seek outside professional advice or use formalized decision making tools, he would most likely have to have some knowledge of e-commerce and be aware of the benefits in order to consider adopting. Both the previously discussed IT and e-commerce adoption literature offered strong support for such an assertion. Therefore CEO/top management knowledge is included in the preliminary model and defined as: CEO/top management's e-commerce knowledge.

Employee knowledge also received support in innovation, IT and e-commerce literature. As previously discussed, SMEs in Atlantic Canada do not have employees with IT knowledge. Hence, if some SMEs had knowledgeable employees, the business may be more willing to adopt e-commerce. As most SMEs in Atlantic Canada are small, one knowledgeable employee could significantly increase the likelihood of adoption. Therefore, employee knowledge will be included in the preliminary model and defined as: the employees' overall IT (e-commerce) knowledge.

The final construct to be included in the model is size which is defined as: the number of employees. Its inclusion is based on the premise that even among SMEs, larger SMEs will have more resources and are more likely to feel external pressure from customers and competitors to adopt e-commerce. As previously discussed in the IT literature, some contradictory evidence exists in relation to the impact of business size on the adoption of technologies. However, evidence from e-commerce research is less contradictory and research in Canada indicates that firm size is an important facilitator of adoption.

The full preliminary model and the four hypotheses are as follows:

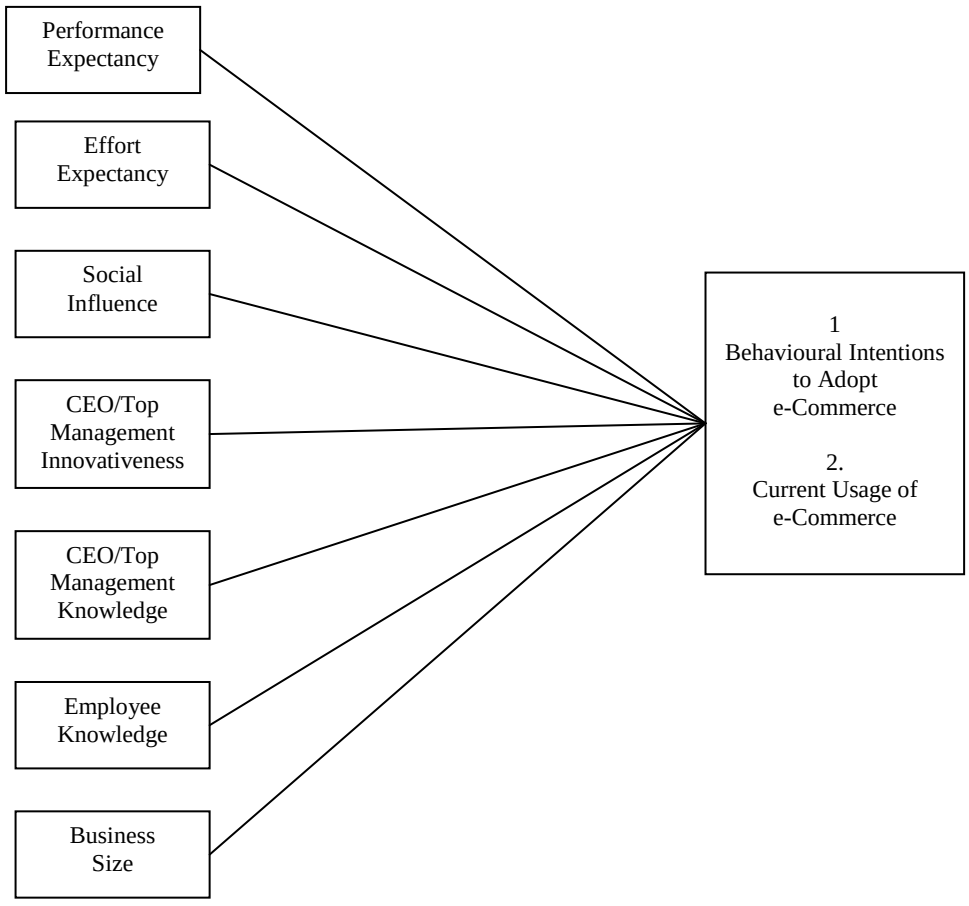
1. The constructs in the model will explain variance (R^2_a) in SMEs e-commerce level of adoption.

2. The constructs in the model will predict/classify users into groups of e-commerce users.

3. The constructs in the model will explain the variance (R^2_a) in SMEs' intentions to adopt e-commerce or to adopt more sophisticated e-commerce technologies.

4. The constructs in the model will predict/classify SMEs' intentions to adopt e-commerce or to adopt more sophisticated e-commerce technologies.

Figure 2.2: Preliminary Model (Note that Behavior Intentions to Adopt and Current Usage of e-commerce are being tested for separately but are included together in one figure in the interest of readability).



Since questions have already been developed in prior research to measure the constructs, they can be adapted for this survey. Three pilot studies are used to ensure that the model and the accompanying survey are, in fact, acceptable to measure the constructs and that the survey instrument is appropriate. Furthermore, the pilot studies assist in identifying any other factors that may explain intentions to adopt e-commerce among Atlantic Canadian SMEs.

2.10.3 Factors omitted from the Preliminary Model

The following is a discussion surrounding the factors that were omitted from the preliminary model. The preliminary model will be subject to three pilot studies. If strong and consistent support is evident for any of these omitted constructs or any new constructs emerge, they are considered and/or included in the model prior to the full study.

Perceived behavioural control and compatibility are omitted from the preliminary model for a number of reasons. Venkatesh et al. (2003) and Taylor and Todd (1995b) have noted that the factors are closely linked and capture similar concepts that refer to a firm's ability to incorporate technology/innovation into a company (Venkatesh et al. 2003; Taylor & Todd 1995b). Research has indicated that when constructs that capture ease of use/complexity and perceived benefits are included in a model, perceived_behavioural control/compatibility becomes a non-significant predictor of intentions (Venkatesh et al. 2003; Venkatesh 2000). Furthermore, the constructs often capture a firm's ability to pay for an adoption or the ability of the innovation to complement current resources. While the characteristics of SMEs may support the inclusion based on the small financial resources that they possess, this is countered by research that indicates that most SMEs in Canada do not consider the cost of e-commerce to be a major barrier. Most SMEs in developed countries such as Canada have a PC (Barba-Sánchez, Martínez-Ruiz & Jiménez-Zarco 2007) and an Internet connection so it is assumed that use of e-commerce technologies would complement their current resources.

CEO/top management support was also omitted from the preliminary model. This was done because the construct related to perceived future benefits labeled as performance expectancy in this research captures this construct in e-commerce research (Grandon & Pearson 2004b, 2003). This would make sense as a top manager would express their support by asserting whether they thought a technology would or would not provide future benefit. Furthermore, parsimony is desirable and a CEO/top manager would be expected to be both innovative and knowledgeable if they are going to support adoption. Thus the decision was made to omit the construct pertaining to support.

The last construct not included in the model was external IS expertise. As discussed in the IT section of this chapter, the construct has received mixed results with Thong, Yap and Raman (1996) finding support for the role of vendors or consultants in the adoption process. DeLone (1988) and Proudlock, Phelps and Gamble (1999) found contradictory evidence. Based on what we know about SMEs and Atlantic Canada, it is likely that most firms in the region do not have access to consultants or vendors due to the rural nature of the area and the lack of available IT specialists. Furthermore, most of the SMEs in the region are very small and would lack the resources to pay for outside assistance. Thus the construct was omitted from the final preliminary model.

2.11 Summary of the Literature Review

This chapter provided a comprehensive review of the literature as it pertains to the adoption of innovations, IT and e-commerce. After discussing the literature, a preliminary model was constructed to explain both the variance in intentions to adopt e-commerce and the current state of e-commerce usage. The following chapter will discuss the research methodology followed by results of the comprehensive pilot studies in the next chapter.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

The previous chapter reviewed the literature, presented a research objective and identified a number of research questions to speak to the objective, including a proposed model constructed to explain both the variance in intentions to adopt e-commerce and the extent of e-commerce use among Atlantic Canadian SMEs. This chapter outlines and justifies the research methodology used to meet the research objective including the procedures followed in testing the proposed model.

The research consists of three phases that are all aimed at fulfilling the research objective and subsequent questions:

Phase 1: Literature Review
Phase 2: Two pilot studies
Phase 3: Survey to test the model and fulfill the research objectives

Chapter 3 begins with a discussion about the research paradigm that serves as the building block for the research design of this study. The author then discusses and justifies the use of pilot studies as part of the research methodology and examines the two pilot studies used in this research. The first case-based pilot study is examined in more detail including the validation of the participant selection, data collection methods, case study questions, interview and transcription process and the data analysis. The second pilot study, a scaled down version of the full study, is then discussed, including the rationale for the selection and number of participants, the questionnaire, and data analysis employed. The chapter then examines the full study, including justification for choosing a random survey, as the research instrument, the development of the questionnaire, participants and sampling procedures, survey execution, and data analysis. The chapter concludes by stating both the limitations of the research and the ethical considerations.

3.2 Research Paradigm

A paradigm is a set of beliefs and feelings about the world shared among scientists about how problems should be understood and addressed (Kuhn 1962). Establishing a paradigm is an important first step in the research process, as it sets down the intent, inspiration and prospects for the research. Selecting a paradigm is the base from which subsequent choices are made (Mackenzie & Knipe 2006). The paradigm is essential because it guides the researchers (Guba & Lincoln 1994). The paradigm for this study is positivism, which basically assumes that the world can be explained through observation and theory testing. Positivists think that science must only accept facts that are observable and measurable, and knowledge beyond this is impossible (Tsoukas 1989). Mertens (2005) and O'Leary (2004) both state that positivism aims to test theories about the world through observation and measurement. Guba and Lincoln (1994) make similar statements noting that the positivist paradigm must contain an objective reality that can be systematically studied, that the researchers remain independent from the study and that general theories serve as the building blocks from which hypothesis are drawn followed by empirical testing. The research in this study starts with broad literature review that

narrows. A model and hypothesis are constructed from this literature and empirical testing occurs thus lending itself to the positivist paradigm.

3.3 Phase 1

The first phase consisted of a literature review that led to the development of the research objectives to examine the use of e-commerce in Atlantic Canada and a preliminary research model to explain both the intention of Atlantic Canada SMEs to adopt e-commerce and the extent of current use. The review began with a wide range of readings on research related to Innovation, Technology Adoption IT, IS, e-commerce and eventually narrowed as the major research objective became clear. The research relied on the use of business and information technology databases including Emerald, EBSCO, Pro Quest, and Science Direct, as well as a manual search of journals and research material at five university libraries. In addition, information specific to Canada and Atlantic Canada was obtained from various government departments and agencies. A preliminary model to explain the intentions of SMEs to adopt e-commerce and the extent of e-commerce adoption was then constructed using research on Innovation and Technology Adoption as the base, and then specific factors from research that related directly to SMEs and their adoption of technology and e-commerce were added. The preliminary model also accounted for factors that were specific to Canadian and Atlantic Canada SMEs. The research objective and the preliminary model were then used as the starting point in the design of the data collection phase.

3.3.1 Phase 2

Two separate pilot case studies were completed in phase two. Pilot studies are defined as small-scale exploratory research techniques where data is collected from the target respondents but sometimes without the same standards as the full scale study (Zikmund 2003). Pilot studies are used to assist in defining and/or refining research questions and testing the instrument (Zikmund 2003; Cooper & Schindler 2001, 1998). The first study consisted of five interviews with owners of SMEs, who were the targeted respondents of the research. These interviews assisted in the acceptance, rejection or revision of research questions posed in the literature review chapter, assisted in further defining the preliminary model and helped in determining how to categorize SMEs' current use of e-commerce. The second pilot study consisted of a small scale version of the full study and aided in finalizing the research questions and the proposed model. This pilot study was made up of telephone surveys and interviews with the owners of SMEs in Atlantic Canada. This follows the procedures outlined by Cooper and Schindler (2001), who noted that pilot studies: *'should draw subjects from the target population and stimulate the procedures and protocols that have been designated for the data collection*' (p. 81). Thus, the pilot stage of the research consisted of multiple methods of data collection which increased the richness and validity of results (Mingers 2003) and led to the finalizing of the research questions and model (Zikmund 2003). At the end of the second phase, the research questions and the proposed model were either confirmed or modified.

3.3.2 Phase 3

The third phase involved the use of a large scale survey to gain insight into the use of e-commerce in Atlantic Canada to test the research model. Since a main component of the research was to examine the variance in intentions to adopt e-commerce, firms that participated in the study were first placed in a category or stage to describe their current adoption, and the organizations were questioned about their intentions to move to the next category or stage. This is in keeping with the recommendations made by Tornatzky and Klein (1982) in their Meta-Analysis of Innovation Adoption, in which they state that any research on innovation adoption must be forward-looking and not retrospective. This recommendation was echoed by Venkatesh et al. 2003. Harrison, Mykytyn and Riemenschneider (1997) perhaps best summed up the need for future oriented questions when they stated that questions that are asked retrospectively about a person's or organization's intent to conduct an activity such as adopt an innovation have little meaning. The main goals of this stage were as follows:

- To determine the use of e-commerce by Atlantic Canadian SMEs
- To examine the use of websites by Atlantic Canada SMEs
- To test the proposed model

In summary, the research methodology consists of three phases: the first stage is to complete a detailed literature review and construct a preliminary model; the second phase is to complete two separate pilot studies on the model that make use of both quantitative and qualitative research to either reconfirm the model or to make modifications or deletions; finally the model is tested in the third stage in a large quantitative survey. The phases followed in this model are similar to the ones posited by Cragg (1996), who articulated the stages that should be used in constructing a model to explain the intentions of SMEs to adopt e-commerce.

3.4 Pilot Study

As stated above, pilot studies are defined as small scale research projects that assist in modifying or finalizing research questions, assist in pre-testing the questionnaire, and allow for some initial statistical analysis to ensure that the proposed data analysis techniques are appropriate (Zikmund 2003; Cooper & Schindler 2001). As indicated above, the literature review established a research objective, which was to examine the use of e-commerce in Atlantic Canada, and a preliminary model aimed at explaining both the extent of e-commerce use and to explain the variance in intentions to adopt e-commerce. Along with the development of the initial model came the development of a preliminary survey instrument, which was adapted from previously used and validated questionnaires.

The pilot study for this research was designed to meet a number of objectives. The first was an examination of the research objective; the second was an examination of the variables in the model; and the third objective was to pre-test the questionnaire. The first two objectives were met using case studies, as they assist in narrowing down the scope of research (Zikmund 2003; Sekaran 2000) and are considered appropriate to produce findings that are generalizable to theoretical propositions (Yin 1994). The third objective was met by completing a thorough examination of the

questionnaire, prior to launching the full survey by completing a scaled down version of the full study (Cooper & Schindler 2001, 1998; Tull & Hawkins 1997). Such pre-testing of the questionnaire is an important part of research design, as it assists in ensuring that the data collection process is sound by identifying potential errors in the survey instrument (Zikmund 2003; Cooper & Schindler 2001, 1998).

The next section of the research justifies and explains the research methods used in the pilot studies. For the case study component, this section discusses the participants and number of cases used, explains the interview approach and how the data was collected and analyzed. For the scaled down survey, this section discusses the selection of participants, the number of participants, and the method of data collection and analysis.

3.4.1 Participants and Number of Cases

Participants in the case studies were the owners-managers of SMEs in Atlantic Canada, or their designates, who are described as people of considerable authority relating to e-commerce decisions within the firm. Owner-managers were selected as the target group because they were the most likely to make e-commerce adoption decisions for their respective businesses (Daniel & Grimshaw 2002; Fast Forward 4.0, 5.0; McClean, Johnston & Wade 2002; McClean, Johnston & Wade 2003, III 2003; Thong 1999). The use of owner-managers is the same approach adopted in other related research including research conducted by Daniel, Wilson and Myers (2002), Grandon and Pearson (2004), and Harrison, Mykytyn and Riemenschneider (1997).

Five owner-managers of SMEs were interviewed for this research. Flyvbjerg (2006), Zikmund (2003), and Sekaran (2003) all agree that case studies, specifically interviews with knowledgeable participants, are useful in gaining a better understanding of a phenomenon and narrowing down the scope of research. While the general consensus among researchers is that there is no specific number of cases that should be used (Zikmund 2003; Cooper & Schindler 2001; Patton 1990; Romano 1989), some researchers have suggested upper and lower limits. Hedges (1985) and Ellram (1996) note that the number of cases should not exceed 12 – 15, while Eisenhardt (1989) states that any less than four cases would not be acceptable. Other researchers state the purpose of the research and resources available should be considered in establishing the number of cases (Patton 1990; Romano 1989), while Gummesson (2000) says that the researcher should only stop adding cases at the point that no new information is being recorded. Five cases were chosen for this portion of the pilot, as the number met the lower limits discussed by Eisenhardt (1989), and the results from this study will be considered and interpreted along with the findings from a second pilot study that makes use of a survey and consists of larger number of participants. Additionally, resource challenges limited the ability of the researcher to contact additional participants.

The five participants for the study were selected using a judgment sample. The researcher wanted to ensure that the case study participants consisted of a group of individuals who used varying degrees of e-commerce in their business and owned businesses that operated in different geographical areas within Atlantic Canada. Cooper and Schindler (2001) and Tull and Hawkins (1987) both state that judgment samples are appropriate for exploratory research and when future research is going to

occur. Furthermore, the researcher wanted to ensure that at least two of the businesses had significant e-commerce experiences, thus providing a large amount of information for the case study. This has been referred to as information-orientated sampling by Flyvbjerg (2006), who notes that the practice ensures a richer base of information for the reseacher than random sampling.

The researcher started the search for case participants by contacting businesses where the researcher had some previous relation with the owner-manager. Based on the researcher's background and contacts, businesses came from two geographical areas that, in the researcher's opinion, possess characteristics that embody the entire Atlantic Canadian region. Three businesses are in the Halifax Regional Municipality (HRM), a large urban area in the province of Nova Scotia, while the other two came from Cape Breton Island (CBI), a rural region of the same province. This selection of the cases keeps in practice with Yin's (1994) recommendation that the selection of pilot studies take into account convenience, access, and geographic proximity. All of the participants were first contacted by telephone and then sent a brief introductory e-mail about the study. A meeting time was arranged at the participants' convenience to conduct personal interviews. All participants wanted their identity to be confidential and have been labeled A – E to ensure confidentiality. Table 3.1 describes the participants in the study:

Table 3.1: Study Participants

Case	Type	Location	Employees	E-Commerce Capabilities
A	Real Estate	HRM	4	High
B	Transportation	HRM	75	Low
C	Retail	HRM	15	Low
D	Service	CBI	8	None
E	Tourism	CBI	20	High

3.4.2 Data Collection

Interviews were selected as the source of data collection for a number of reasons. As indicated above, interviews with knowledgeable participants can assist in understanding the research problem and narrowing the research (Flyvbjerg 2006; Sekaran 2003; Zikmund 2000, 2003). Interviews also allow for the greatest depth and detail of information compared to other methods (Cooper & Schindler 2001, 1998). Furthermore, Yin (1994) states that case study interviews can provide insight into research problems, while Marshall and Rossman (1985) note that interviewing is a better method of obtaining quality data. Interviews were also selected, as the researcher wanted to have the ability to probe or ask follow-up questions since the length of the questionnaire was considered to be relatively long. Zikmund (2003) notes that personal interviews allow for probing questions and are well suited to long questionnaires.

3.4.3 Case Study Questions

The interview questions asked can be found in Appendix (A) of this thesis. The researcher used a semi-structured format for the interview to ensure that all areas

related to the research were covered. The questionnaire was prepared in advance, as the use of a developed questionnaire minimizes observer bias (Sutcliffe 1999) and the likelihood that the researcher may suggest answers by asking leading questions (Patmore 1998). The interview made use of both open-ended and closed questions. Open-ended questions were used to inquire about the current use of e-commerce by SMEs, potential drivers of e-commerce adoption and to aid in pre-testing the questionnaire. Open-ended questions were used because they encourage respondents to answer freely (Zikmund 2003; Moser & Kalton 1971), respond in their own words (Crano & Brewer 2002), result in unanticipated answers (Zikmund 2003), and often provide richer data compared to closed questions (Minichiello et al. 1995). Open-ended questions were used at the beginning of the questionnaire to encourage people to participate freely in the interview process as recommended by Zikmund (2003) and Cooper and Schindler (2001). Closed questions were mainly used to collect demographic information and to pre-test the questionnaire.

The questionnaire was tested following the method recommended by Cooper and Schindler (2001), who state that a proper pre-test includes questions measuring respondents' interests, questions that ensure that the participants understand the meaning of questions being asked, questions that ensure that the flow and sequencing of the survey is acceptable and questions about the appropriatenes of survey length. The interview can be broken into four sections:

- Section one - contains questions about the company's current use of e-commerce
- Section two - asks the owner-manager to discuss their motives for adopting e-commerce
- Section three - involves a pre-test of the preliminary survey and asks for the respondents to include any additional information on the research topic
- Section four – asks demographic questions

Prior to conducting the survey, it was pre-tested by three colleagues at the researcher's university. Two are well established researchers, while the other has conducted research in the area of small business and IT. Having colleagues pre-test a questionnaire is noted by Cooper and Schindler (2001) as an effective method to improve survey quality. Based on the feedback from colleagues parts of the survey were revised for clarity, some questions were placed in different sequences and some questions were condensed.

3.4.4 Interview and Transcription Process

The interviews all started with an introduction followed by a brief overview of the research objective. After the initial introduction, the researcher asked questions from the specific sections of the questionnaire. As previously noted, a semi-structured format was used and the researcher occasionally probed for additional information. Zikmund (2003) and Davis and Sutton (2004) say that probing is helpful in gaining further information from a survey participant and when the interviewee loses track of his/her responses.

The interviews ranged in length from 35 – 70 minutes and the researcher followed the transcribing procedures outlined by Zikmund (2003). Closed questions were

marked accordingly on the survey and open-ended questions were recorded verbatim. The researcher then re-read the participants' answers back to them to verify their responses. The researcher did not tape record the interview due to limited resources but felt his interview skills from previous work as a journalist in the newspaper industry enabled him to interview and record a significant amount of data quickly and accurately.

3.4.5 Data for Analysis

The information from the interviews was then recorded using Excel spreadsheets. The use of spreadsheets allowed the researcher to organize data in an easy-to-read format and to see patterns emerge in the research. Organizing data into sections within a matrix-like structure is acknowledged as a practical method for facilitating pattern matching of qualitative data (Yin 1994).

Cross-case analysis was then used to gain insight into the research objective, specifically the factors that facilitate e-commerce adoption. Yin (1994) states that cross-case analysis is useful in expanding one's knowledge about a problem. The researcher used the information on e-commerce adoption and facilitators of e-commerce adoption to further finalize the variables in the proposed model and to examine whether the stages of e-commerce use proposed in the literature review are applicable to SMEs in Atlantic Canada. The researcher also made use of a pre-test to examine the preliminary survey to further finalize both the model and the questionnaire. The researcher made use of quotes from the participants as recommended by Patton (1990) to assist the reader in gaining insights into the issues being studied. In summary, the data analysis from the case studies was used as follows:

- To gain further insight into the facilitators of e-commerce among Atlantic Canada firms
- To examine the categories of SMEs' e-commerce use proposed in the literature review and see if they are applicable to Atlantic Canadian SMEs
- To further define the variables in the proposed model
- To further confirm or disconfirm the variables in the proposed model
- To pre-test the questionnaire to gauge respondents interest in and understanding of the questions being asked, and to ensure that survey flow, sequencing and length are acceptable.

3.5 Pilot Study – Survey

After completing the case study section of the pilot, the researcher then conducted another pilot test, which was a small scale test of the full study. This pilot mirrored the full study as closely as possible and used the same procedures and protocol. This pilot test was aimed at further developing the research objective, confirming or denying variables in the research model, pre-testing the questionnaire, and completing some initial data analysis to ensure that the methods selected were applicable to the study (Zikmund 2003; Cooper & Schnider 2001, 1998). Since this pilot study is a scaled down version of the full study many of the issues relating to data collection, selection of participants, and data analysis are the same as found in the full study. Hence, a discussion of these research methods will not be duplicated

here. This section will examine the nature and number of participants, questionnaire design, and data analysis. Any research methodology segment that is not specifically addressed in this part of the chapter is examined when the methodology for the full study is discussed.

3.5.1 Participants and number surveyed

Target participants were the same as those in the full study, that is, owner-managers of SMEs or their designate. The study consisted of 31 participants as this number fell into the range that was recommended by several research colleagues. Cooper and Schindler (2001) state that the number of participants in a scaled down study should range from 25 – 100, depending on the size of the full study. While 31 participants is toward the lower end of the suggested range it does fit within their recommendation.

3.5.2 Questionnaire Design

Since the goal of this pilot survey was to mirror the full survey as closely as possible, the questionnaire in this pilot was designed to be as similar as possible to what was expected to be used in the full survey. The preliminary survey was originally based on questions that were adapted from previously used and validated research tools. This survey was then revised based on the first pre-test administered to colleagues and then further revised based on the information gained from the case studies. The resulting questions in the survey were all closed (Appendix B), with the exception being some open-ended questions that aided in the pre-testing process.

3.5.3 Data Analysis

The data analysis of this pilot study was identical to that outlined in the research methodology section for the full study. The only exceptions were the analyses of the open-ended questions that were aimed at pre-testing the questionnaire. Results from the open-ended questions were placed in an Excel spreadsheet, much like the information from the case study interviews, and were examined for patterns using cross-case analysis.

3.6 Full Study – Survey

After the research objective and models were reviewed in the pilot studies, the researcher engaged in a full study using surveys as the method of data collection. Surveys were chosen because they provide a quick, efficient, and accurate means of assessing information about the population (Zikmund 2003). Furthermore, surveys allow for the testing of theories, which is essential to the research objective and model outlined in this study. Surveys also offer a number of advantages to other forms of data collection, including but not limited to, the following:

- Economical and efficient way of collecting large amounts of information from participants regardless of their location (Easterby-Smith, Thorpe & Lowe 2002).
- Survey data usually allows for the administration of various statistical tests, including the testing of theoretical models (Zikmund 2003).

- People may be more prone to answer questions, compared to other methods of data collection (Zikmind 2003).

3.6.1 Telephone Survey

After justifying the use of surveys as the data collection method, the researcher then opted to make use of the telephone to conduct the survey. The selection of telephone surveys was made for a number of reasons that led the researcher to believe that it was more advantageous than mail surveys or personal interviews. One of the main reasons for selecting the telephone technique over mail surveys was that the target population consisted of people who made e-commerce decisions for SMEs, most likely owner-managers or top level managers such as the CEO or President. The use of the telephone would ensure that the survey participants were either the owner-manager or a decision maker of considerable influence with regard to the company's use of e-commerce and that the business being studied could be considered a SME as defined by this study. This would avoid a problem associated with mail surveys where the survey is completed by someone other than the desired target (Zikmund 2003, Cooper & Schindler 2001). In addition the questionnaire, while not being overly complex, could not be described as simple. The use of telephone technique would allow for the clarification of terms something that would not be possible in a mail survey. While both telephone surveys and personal interviews allow the researcher to pre-screen participants to ensure that they are members of the target population, and while both permit the clarification of the questionnaire, only the telephone technique does so in a fast, economical fashion with the absence of face-to-face contact (Zikmund 2003).

In addition to the advantages noted above telephone surveys offer the following advantages compared to other survey techniques:

- Speed – they are faster than other forms of data collection
- Cost efficient compared to personal interviews and mail surveys
- Absence of face-to-face contact
- Increased co-operation

3.6.2 Questionnaire

As previously stated the questionnaire was adapted from previously validated research and was then pre-tested first by colleagues of the researcher and then in two pilot studies. Through the various stages of pre-testing, there were few changes to the survey outside of the modification of some questions, the reordering of questions and the clarification of some terms. The final questionnaire contained closed questions consisting of simple-dichotomy, determinant-choice, and attitude questions. The advantages of closed questions are that they take less time and are easier for the respondent to answer. Lickert-scale questions were used to measure attitudes, as their use was verified from previous studies, and they are appropriate for measuring the intensity of the value or belief about various items, such as the predictors used in this research (Oppenheim 1992). Furthermore, Lickert scales offer a number of advantages, including their simplicity to administer and construct

(Zikmund 2003), and their increased reliability compared to other scales with the same number of items (Tittle et al. 1967).

The full survey instrument found in Appendix C, consisted of the following sections:

- Section one – Preamble asking to speak to the owner or CEO
- Section two – Questions about the firm's demographics
- Section three – Questions about the firm's current use of e-commerce
- Section three – Questions about the firm's use of websites
- Section four – Questions specific to the model

Some specific sections on the questionnaire need highlighting, due to their importance to the research. First, it is important to the research that the surveys' participants strongly influence their firm's decision to adopt e-commerce. Thus, each participant was asked to evaluate their influence on a scale of 0-100%. If the participant indicated an influence level below 50%, their final survey was removed prior to data analysis. This self-evaluation question was used successfully in similar research and is recommended by Harrison, Mykytyn and Riemenschneider (1997) and Thong (1999) as a means to ensure that the participant is actually involved in the decision making process.

Secondly, since the model was developed to examine firms' variance in intentions to adopt additional e-commerce technologies, all participants were asked to categorize their business's current use of e-commerce into one of six stages. They were then asked to consider their intentions to move to the next level of e-commerce in the questions pertaining to the model. Firms that reported being at the most sophisticated level were not included in the data analysis section of the study that dealt with explaining adoption intentions of additional e-commerce technologies. This was in keeping with previously discussed recommendations that intention models should be forward looking and not retrospective (Venkatesh et al. 2003, Thong 1999; Tornatzky & Klein 1982). The classification of e-commerce adoption in stages is supported by international and Canadian research that indicates most SMEs adopt e-commerce in sequential stages, first adopting basic technologies and then moving to more sophisticated technologies over time (Daniel, Wilson & Myers 2002; Knol & Stroeken 2001). In fact, Canadian research strongly supports this claim in a number of studies which indicate that SMEs first adopt e-mail and Web browsing, progress to marketing functions and then proceed to adopt such sophisticated technologies as online payment processing, and interactive websites and so forth (Fast Forward 4.0 2003, 5.0 2004; McClean, Johnston & Wade 2002; McClean, Johnston & Wade 2003, III 2003). Unfortunately, the studies have not substantially concluded what motivates the movement between stages and why so many firms become stalled at early stages of adoption.

The six stages or levels used are as follows:

1. No use of Internet technology
2. Using basic Web browsing and email
3. Maintaining a website for promotional purposes, engaging in email and internet browsing
4. Taking orders via the website and/or making online purchases

5. Completing online purchasing and selling transactions, making and accepting online payments
6. Completing all transactions on the Internet, using an interactive website and/or personalized websites for suppliers and buyers

The full survey was 11 pages long, and the time for completion ranged between 10 – 25 minutes. While some have indicated that this may be long for a telephone survey and may reduce the response rate (Zikmund 2003), there is research that contradicts this statement. Premkumar (2003) notes that 20 – 30 minutes is acceptable for a telephone survey and De Vaus (2002) found little support for the notion that the questionnaire length deters respondents and increases the non-response rate. Therefore, after completing a rigorous screening of the questionnaire through two pilot studies, one of which had participants complete the survey over the telephone, it was decided that questions would not be deleted or modified to achieve a shorter survey.

3.6.3 Participants and Sampling

As previously discussed, the targeted respondents were the owner-managers of SMEs, or their designates. The target population consisted of SMEs operating in Atlantic Canada. The sampling frame was the Yellow Pages listings, as it was determined to be the best source of potential participants by the researcher, a fact that was confirmed by the researcher's colleagues.

The researcher decided to use a sample of the population, instead of a census, for a number of reasons. A census was determined to be too costly and time consuming, while a properly conducted survey is accurate, less time consuming, and requires fewer resources (Zikmund 2003). The sample technique used for this survey was simple random sampling which is a sampling procedure where each element in a population has an equal chance of being selected (Zikmund 2003, Cooper & Schindler 2001). While it has been noted that gaining a representative sample can be problematic when using a telephone directory, this problem usually only applies when the target is the general population and is not applicable to business or organization listings (Zikmund 2003). In relation to sample size, the researcher targeted 300 participants, as the number would be categorized as large compared to other studies as indicated in Tables 2.3 and 2.4 of the literature review.

3.6.4 Survey Execution

The researcher telephoned 1836 businesses from August to December of 2006 and achieved a sample size of 289 participants, a response rate of 17%. The researcher had targeted a response rate of 288 as this would result in a 95% confidence interval based on the formula $N = z^2(pq)/e^2$ (Sincich 1996). Random sampling was followed with names being drawn from the Yellow Pages listings. Each firm was called five times prior to moving on to another randomly drawn business. The procedure for the execution of the survey was as follows and was based on work by other researchers whose targeted respondents were owners-managers of SMEs, or their designates:

- Step one – Firms were called and screened to see if they were in fact SMEs according to the definition used in this study (fewer than 200 employees).

- Step two – Respondents were pre-screened to determine if they individuals of authority with regard to decisions pertaining to e-commerce adoption. While the survey was directed at the owner-manager, a designate was considered suitable.
- Step three – Following the initial screening the survey was complete or arrangements were made to complete the survey on a specific date and time.

The researcher took several steps to encourage participation in the survey, including asking questions that would be considered interesting to the participant and communicating that the survey was of high ethical standards. The researcher also offered to allow respondents to complete the survey at their convenience as well as share the final results of the survey with the participants in a condensed format (Zikmund 2003, De Vaus 2002; Cooper & Schindler 2001).

3.7 Data Analysis

The survey data were entered into the computer software program SPSS (Statistical Package for the Social Sciences). A great deal of care was taken to ensure that the data were entered correctly into the computer. The data entry was double checked and sometimes checked three times to ensure accuracy.

The analysis of the full study involved a number of steps. Descriptive analysis was used to transform the data into a form that is easy to understand and interpret (Zikmund 2003). Descriptive techniques used included simple tabulations, frequency tables, and percentages.

The two major hypotheses or research questions in the study related to the effectiveness of the model in explaining the variance in intention to adopt e-commerce technologies and the extent of current e-commerce adoption were then analyzed. This analysis consisted of calculating the mean and standard deviation for each attitudinal question that made up each construct/variable to gain further insight into participants' thoughts about e-commerce. Regression analysis was then performed to determine the variance in intentions to adopt more sophisticated technologies. Regression is an analysis of the effect of two or more independent variables on a dependent variable (Zikmund 2003) and is appropriate for this type of research (Abdullah, 2002; Sathye & Beal 2001; Harrison, Mykytyn & Riemenschneider 1997).

The second hypothesis relating to explaining the current extent of e-commerce use was tested using discriminant analysis. Discriminant analysis is a test technique that predicts the probability that an object will belong in one of two or more mutually exclusive categories (Zikmund 2003). In order to conduct the test firms were broken into three categories – low, moderate and high adopters. Discriminate analysis was then used to determine if the model correctly classified the firms. The use of discriminant analysis to classify adopters of technology can be found frequently in research including work by Grandon and Pearson (2004), Thong (1999), and Premkumar and Roberts (1999).

3.8 Limitations

As with almost any research, this study has several limitations. Thus, the findings must be interpreted with the following limitations in mind:

Non-respondents – Non-response error is the statistical difference between a survey that includes only those who responded and a perfect survey that includes both non-responses and responses (Zikmund 2003). In order to check for non-response error, the demographics of the sample have been compared to demographics of the target population as recommended by Zikmund (2003) and used in similar research by MacGregor and Gomes (1999) and Proudlock, Phelps and Gamble (1999). It is important to note that McDaniel and Gates (1993) found that of all the Information Technology studies that looked at the difference between non-respondents and respondents, none reported any meaningful difference.

Self Reports from one owner/designate – The research only surveyed a single respondent from each firm inquiring about their organization's e-commerce intentions. Rogers (1995) states that there is a problem with this approach, as it reduces the complexity of a business down to the viewpoint of one person. Thus, it is reasonable that a different person in the firm may provide slightly different answers. It should be noted that the owner-manager/CEO, or their designate, was the target of the survey and as indicated in the literature review the majority of decisions made by SMEs are made in a central fashion usually by the owner or CEO. Therefore it is reasonable to assume that their intentions would be representative of the firm. Furthermore, the survey also asked the individual to rate his or her influence on e-commerce decisions on a scale of 0-100%, and if he or she indicated less than 50%, their answers were dropped from the data analysis as it pertains to explaining future intentions.

Self-generated validity (Feldman & Lynch 1988) – If the survey asks the respondents about issues that they have given very little prior thought then they are likely to construct answers based on the measurements taken on these issues. Respondents are apt to use answers to earlier survey questions as the basis for their responses to later questions, resulting in an inflated casual linkage. Since the majority, if not all, of the firms in the study have heard about e-commerce and have given some thought to the implications of e-commerce on their business model, this should not be the case with this research.

Geographical – The results only reflect SMEs in Atlantic Canada, which is one geographical region within Canada. While it would be useful to have the research tested across several countries, it should be noted that the response size for the study (289) is not small and the geographic region is both large and represents a diverse culture, climate and business environment.

3.9 Ethics

The issue of research ethics was considered to be of the highest priority throughout the various stages of this research. As noted by Zikmund (2003), the researcher has an obligation to follow societal norms and has a responsibility and obligation to protect the interests of the respondent. Generally speaking, the researcher must

ensure that respondents do not suffer any harm, pain or loss of privacy (Cooper & Schindler 2001). Furthermore, it is accepted practice that ethics is considered part of the research design process (McDaniel & Gates 1991). In order to protect the rights of the respondents, the researcher paid close attention to the ethical guidelines established by O'Sullivan and Rassel (1989) when establishing the research protocol:

- Begin data collection with an honest explanation of the research to the respondent
- Thoroughly explain the respondents' rights and how they are being protected
- Obtain informed consent.

The researcher applied for and received ethics clearance from two research ethics boards – the USQ Ethics Committee and Mount Saint Vincent University Department of Business and Tourism Ethics Committee. During the research process, the researcher paid careful consideration to all ethical concerns including the following:

Informed Consent – Obtained from all respondents. The request was worded as simply as possible and stressed the respondent's rights in the research process.

Respondents' Rights – Respondents were informed that they were free to withdraw from the survey at any time and, in addition, could skip any question that they felt uncomfortable answering.

Confidentiality – Respondents were assured that their privacy would be protected and that their organization's name, e-commerce practices, and future adoption intentions would be disguised and not revealed in any manner.

Reporting of Findings – All respondents were told that they had the option of requesting a summary report at the time of their participation in the survey or could do so at a later date.

Contact Details – The researcher's full contact details were provided at the start of the interview/survey.

3.10 Summary

Chapter 3 contained a description and justification for the research methods used in this study. The chapter first discussed the research paradigm and then reviewed pilot studies that were used to further examine the research objective and questions. The chapter then reviewed the full survey, including a discussion on key aspects of the questionnaire and how the data was analyzed. The chapter ended with a discussion of limitations that may impact the research and a description of the role that ethics played in the research. Chapter 4 contains an examination of the two pilot studies, while Chapter 5 contains the data analysis for the full study.

CHAPTER 4: ANALYSIS AND IMPLICATIONS OF THE TWO PILOT STUDIES

4.1 Introduction

The information from the pilot studies is now discussed and analyzed. The chapter starts with an examination of the results from the case study interviews, including a description of the businesses incorporated in the study, followed by a cross case analysis. The focus of the interviews is on the types of e-commerce used and the facilitators and/or barriers of e-commerce. The impact of the case studies is then further analyzed as it relates to modifying or confirming the preliminary model and questionnaire. The second pilot study, a survey, is then discussed, including a scaled-down data analysis followed by an examination of the impact of this pilot study in relation to the proposed model and questionnaire. The chapter concludes with a summary of the findings.

4.2 Individual interview summaries

A short description of the interviews with the SMEs is provided, including a discussion about the forms of ownership, decision making policies, e-commerce use, and facilitators of and barriers to e-commerce adoption. Any information that likely makes the identification of the company possible is omitted in order to protect the confidentiality of the SMEs. The cases are presented in the order in which the companies were interviewed.

Firm A

Firm A is a small real estate company that specializes in the listing and sales of residential homes in Halifax Regional Municipality. The company is a family owned business that is structured as a partnership between the father who founded the company and his son. The company consists of four employees, all of whom are licensed real estate agents who sell or list properties on behalf of prospective home buyers and home owners. The owners/partners make all of the decisions for the company, including decisions about the use of IT and e-commerce. The company's use of IT and e-commerce would be considered significant as it is integral to the majority of the firm's operations.

Speaking specifically of e-commerce, the company uses e-mail as their main source of communication both internally and externally. E-mail is frequently used to share information on properties, schedule appointments, and to exchange important information, such as offers on a home or contractual information. The firm's owner feels that e-mail has vastly improved the sharing of information, both among employees and with clients. As much of the agents' work is done outside of the office and throughout the Halifax region, e-mail assists the employees and owners in staying in touch with one another. Furthermore, e-mail is used as one of the company's main marketing tools, as it allows agents to quickly send clients large amounts of property information. Both customers and potential customers can e-mail the firm or specific agents directly from the company's website. The firm's dependence on e-mail for sharing information and marketing the firm has resulted in the firm embracing wireless technology.

The company is heavily reliant on online marketing to advertise current properties and their listing service. The company uses two marketing websites, infrequently produces an online newsletter, and e-mails potential and current clients about information on its services and properties. The company operates one public website and contributes information to a national public website that features homes for sale. The company's website features a number of technologies that highlight their products, including a search engine that is specific to the site, pictures of properties that are for sale, and video clips and virtual tours of homes. The website also includes tools such as mapping software, which provides directions to properties, and a number of calculators that assist buyers and sellers in their decision making. In addition, the website also contains a great deal of additional information, including material on how to buy and/or sell a home, information on the local and national real estate market, biographical information for the sales/listing agents, licensing information, and lists of neighborhoods or areas in which they specialize (example: condominiums). The website features key contact information, hours of operation, and pictures of their office.

The national site allows the company to offer their clients a comprehensive search of listed homes and post descriptions and pictures of the homes they are selling. The company's independent research, along with research conducted by a national body, indicates that the use of websites is perceived as the most useful marketing tool by their clients.

In addition to the company's web presence, they make use of online newsletters to inform clients about the state of the local real estate market and to inform people about their services. They also frequently e-mail clients information on homes that have recently been listed for sale, new housing developments, changes in interest rates, and other information that they think may create value for their clients. In addition, the business makes occasional use of online display advertisements on local newspaper and/or business websites.

The firm makes use of e-commerce through the sales and/or listing process. While the firm does not allow for direct online sales, negotiations on a property may occur though e-mail. E-mail is also often used to send key documents, including contracts, agreements and other pertinent information.

The firm makes heavy use of web browsing to view listings by other real estate companies. The owner of the firm pays attention to articles on the industry and the economy.

At the time of the interview, Firm A was looking at additional ways to market their products and services online, although they felt that they currently make use of the most sophisticated technologies for their respective industry. The most important facilitators for the firm in engaging in e-commerce have been the perceived benefits associated with e-commerce use. Technologies, such as e-mail, have resulted in significant cost savings, allowed for the sharing of a tremendous amount of information, and improved the quality and efficiency of the negotiations process. Furthermore, online marketing has become the main marketing tool used by the firm as it allows the company to display a significant amount of information at a low cost. The company feels that it has essentially followed the lead of larger real estate

businesses that operate locally and nationally and has copied much of what those companies first adopted.

Firm A plans to continue to make use of the Internet as a business tool and to embrace new technology that is relevant to their industry. They have no future plans to adopt anything specific, though, as they feel their industry as it relates to e-commerce may be at a mature stage. Firm A notes that no barriers exist to adopting any other technology as long as it would be helpful in their business and relatively easy to use. Table 4.1 summarizes the firm's characteristics.

Table 4.1: Characteristics of Firm A

Business	Real Estate
Location	Halifax Regional Municipality
Size	4
Ownership Structure	Partnership
Decision Making	Highly Centralized
E-commerce Use	1. E-mail: range of activities, including sharing of information, establishing appointments, negotiating on the sale of properties, and marketing 2. Online marketing: website with many features, online newsletters 3. Web browsing
Facilitators	1. Usefulness 2. Follow the lead of others
Barriers	1. Ease of use

Firm B

Firm B is a transportation company located in the Halifax Regional Municipality. The business is a private or closely held corporation, which in Canada means that it operates as a sole proprietorship but pays corporate taxes, and the owners are not personally liable for any losses incurred by the business. The company consists of approximately 75 employees. Of those employees, 70 would be classified as truck drivers, two as managers (including the owner who is the President of the company), and three as support staff workers. The manager and owner cooperate to make the majority of decisions together, although final authority rests with the owner. The company's use of IT and e-commerce would be considered moderate, as they use a number of technologies but are not dependent on them for generating revenue and conducting operations.

Looking at e-commerce the company makes use of e-mail to communicate among management and support staff. In addition, e-mail is often used to communicate between management and customers/potential customers. Since many of the firm's customers operate their head offices outside of the region, often in different time zones, e-mail ensures that management of the transportation company can stay in constant contact with key clients. As the owner of the firm is constantly traveling throughout Canada and the United States working with customers, he is heavily dependent on e-mail to keep track of operations, share information, and negotiate contracts. In addition, the firm has started to equip some drivers with wireless communication devices so they can be in regular contact with the main office, make use of portable navigation software, and be aware of road conditions and impending

weather. The plan is to outfit the majority of employees with these devices by the end of 2008.

The company maintains a public website that serves as one of their main promotional tools and offers information to current and potential employees. For customers, the website features a full description of the company's services, information on basic rates, and contact information, along with testimonials and a current customer list. For employees, the website contains links to road reports, weather forecasts, and traffic patterns. In addition, the website features an option for people to apply to work for the company.

While the company does not engage in online sales or EDI, they are heavily dependent on the Internet and e-mail to finalize contracts, send information that relates to the pick up and delivery of goods, and maintain good relations with customers.

The firm's owner uses web browsing to stay on top of trends in the industry. Additionally, he browses the web for market research, including identification of potential customers, and to gather information on competitors.

Firm B's expansion plans consist of equipping drivers with wireless devices as described above. In addition, the owner is looking at installing portable tracking systems on all of his trucks to keep track of mileage, speeds, and location of the trucks. The main facilitators of past IT adoption have been the owner's interest in technology and the Internet in general. He paid close attention to what larger companies were doing by monitoring industry journals, conducting research on the Internet, and asking his peers about their IT activities. The only barriers he has encountered in implementing e-commerce have been getting the drivers to embrace the wireless devices and to understand how easy they are to use. The main barrier for implementing the portable tracking devices is determining whether they are worth the investment.

Table 4.2 Characteristics of Firm B

Business	Transportation
Location	Halifax Regional Municipality
Size	75
Ownership Structure	Closely Held Corporation
Decision Making	Highly Centralized
E-commerce Use	1. E-mail: range of activities, including sharing of information, establishing appointments, and negotiating 2. Online marketing: website for both internal and external use 3. Web browsing
Facilitators	1. Owner's Innovativeness 2. Owner's Knowledge 3. Follow the lead of others
Barriers	1. Ease of use for employees

Firm C

Firm C is a high end clothing store located in the Halifax Regional Municipality. The company is a sole proprietorship with a single owner- manager making both the firm's day-to-day and management decisions. The firm employs 15 employees most of whom can be described as sales staff although two floor supervisors also perform a number of management duties. The firm makes very little use of e-commerce or IT beyond a point-of-sales system and e-mail. The firm's use of e-commerce can be described as low as they do not actively use the technology nor do they depend on it to support any aspect of their business.

The firm does make use of e-mail to send information and orders to suppliers and to stay in touch with some customers. Their use of e-mail could be characterized as inconsistent as the firm is more likely to rely on traditional communication devices such as fax machines or telephones. The majority of e-mail to customers contains promotional information and occasionally an online brochure. The company no longer maintains a website.

As noted above, the company makes use of online marketing through the occasional production of an online brochure. Firm C does make use of the database software to track and identify important customers.

The company's supervisors engage in some minor web browsing to see the latest industry trends and to occasionally monitor the prices of competitors. The company does not participate in any online sales. Rather, they rely on traditional forms of marketing to reach these customers.

The main facilitator of e-mail is its usefulness as a communication device, especially with suppliers. The main barrier is that the owner does not consider e-commerce to be very useful to his business, and he considers himself to be very technologically illiterate. The owner does not see how online sales would be helpful to his business or how a web presence would improve the company's operations. There are no future expansion plans, as the company has been very successful using direct mail, newspaper advertisements, and telemarketing.

Table 4.3: Characteristics of Firm C

Business	Retail
Location	Halifax Regional Municipality
Size	15
Ownership Structure	Sole Proprietorship
Decision Making	Highly Centralized
E-commerce Use	1. E-mail: limited activities, consistent contact with suppliers, inconsistent contact with customers 2. Online marketing: sporadic use of online brochures 3. Web browsing: sporadic use
Facilitators	1. Usefulness
Barriers	1. Lack of use 2. Owner's lack of knowledge

Firm D

Firm D is a driving school that operates on Cape Breton Island. The school specializes in two growing areas: teaching first time drivers and assisting aging baby boomers in keeping their licenses. The school operates as a sole proprietorship with a highly centralized structure. At the time of the interview, the firm employed eight people, four of whom were related to the owner. The firm makes no use of IT or e-commerce in the running of the business.

The major barriers for the firm in adopting e-commerce are the owner's lack of knowledge and desire to innovate. The owner started the business as a part-time venture as he was contemplating retirement from his career as an accounting teacher. The business grew faster than he expected and he retired early to manage the operations of the company. Prior to teaching, he worked as a professional accountant for a number of years. He maintains very traditional, albeit thorough, business records. The owner also feels that e-commerce, while popular with the younger customers, is an unnecessary expense. He points to the fact that he generates more revenue than any of his competitors by using traditional marketing and strong customer service. The firm is considering adopting a website with the only facilitators being that it may help attract younger clients, and the owner does not want to be the last local company to do so.

Table 4.4: Characteristics of Firm D

Business	Service
Location	Cape Breton Island
Size	8
Ownership Structure	Sole Proprietorship
Decision Making	Highly Centralized
E-commerce Use	None
Facilitators	1. Usefulness 2. Owner doesn't want to be the last company to adopt
Barriers	1. Not useful 2. Owner's lack of knowledge

Firm E

Firm E is a tourism company that offers pre-packaged tours of Cape Breton Island. The firm is a closely held corporation with 20 employees: three are considered managers, two are support staff, and the remainder are tour guides. The three managers all own a stake in the business, although there is only one majority shareholder. The managers usually make significant decisions together. The company's use of e-commerce would be considered significant, as it has been deemed the most important marketing and sales tool by the firm.

The firm makes frequent use of e-mail and wireless devices. Internally and externally, e-mail is used as the main source of communication. The managers are constantly traveling and rely on e-mail to communicate and share documents. All the employees (tour guides) are equipped with wireless devices and remain in close contact with head office and other guides while operating their tours. The tour guides rely on the devices to keep track of schedules, communicate road and weather conditions, and to share all relevant information. Externally, the firm uses e-mail to communicate with customers and suppliers. The majority of customer

communications come via e-mail, including requests for information and orders for tour packages. Furthermore, the firm's suppliers are crucial to the company as Firm E subcontracts out all accommodations, activities, and meals to individual operators. Since the suppliers are spread over a diverse geographical area, both parties rely on e-mail to exchange information, including bookings and price negotiations. For the firm, e-mail has replaced telephones, faxes, and couriers as the main source of communication with what was described as significant time and cost savings.

The company operates a public website that offers a great deal of information and serves as the main marketing tool for the business. The website contains a full description of their products along with pictures, videos, and testimonials. Customers can e-mail the company directly from the website. The site also contains all relevant contact information and a number of links that connect browsers to information about the region. The company also engages in other online marketing activities, including e-mails, online advertising in the form of banners, and working with search engines to ensure a high placement in web searches. Customers can request information directly from the website, and the company will send out materials designed to appeal to customers' personal demographics and tour interests.

The company's managers frequently browse the web to see what competitors are charging, to identify new types of products and services, and to conduct research on the industry.

The company also offers online sales. Consumers can book and pay for packages directly online, e-mail an order, or call the company directly. The website offers a number of payment options, and the firm notes that approximately 40 percent of their sales come directly over the Internet.

The owners cite the quick rise in Internet use among its customer base and the overall benefit of using the Internet as the main drivers of e-commerce adoption. The firm believes their marketing and communications have been greatly improved because of e-commerce. The major barriers to e-commerce have been a lack of knowledgeable IT consultants in the area and the slow development of the local infrastructure to support wireless devices and high speed Internet. The company has no immediate expansion plans. This may be because at the time of the interview, the owners were in the midst of planning an exit strategy which may involve the sale of the firm.

Table 4.5: Characteristics of Firm E

Business	Tourism
Location	Cape Breton Island
Size	15
Ownership Structure	Sole Proprietorship
Decision Making	Centralized
E-commerce Use	1. E-mail: range of activities, including sharing of information, establishing appointments, the use of wireless devices, and tracking schedules 2. Online marketing: website with many features, data base marketing, banner advertisements, and key word searches 3. Web browsing
Facilitators	1. Benefits 2. Demand from customers
Barriers	1. Lack of consultants 2. Infrastructure

4.3 Cross-case analysis of the interviews

Cross-case analysis was used to examine the main themes that emerged from the interview transcripts. The first Section 4.3.1 illustrates the main use of e-commerce by SMEs in Atlantic Canada. The main uses specified by the owners influenced both the design and content of the survey used in the second pilot study and the subsequent full study as highlighted in Section 4.4. Section 4.5 examines e-commerce adoption patterns and analyzes the major facilitators and barriers that emerged during the interviews. Section 4.7 addresses the impact that the interviews had on the research including the justification of the preliminary model and research methodology presented in Chapters 2 and 3. Section 4.8 deals with the pre-testing of the questionnaire.

4.3.1 Use of e-commerce by Atlantic Canada SMEs

All SMEs in this case study, with the exception of the one firm that makes no use of the Internet, state that e-mail is extremely important to their business. E-mail is commonly used as the main source of internal and external communication for the companies. All the companies view e-mail as a means of sending quick messages and/or large amounts of information quickly and at low cost. Firms A, B, and E use e-mail to expedite negotiations with both customers and suppliers and do not hesitate to send sensitive information through e-mail. Firm E highlights the importance of e-mail to the firm: *'e-mail has almost become the only source of communication for our business. With employees, suppliers, and customers all spread out geographically, it enables us to communicate quickly and send large amounts of information instantaneously at a low cost. E-mail has become essential to the firm.'*

Firm A echoes the response, noting that e-mail has changed the way the company communicates: *'Prior to e-mail, our employees were heavily dependent on the phone and the fax machine. Employees were always coming into our office to use one or the other. Now with e-mail, they can access messages and documents on the road and not lose valuable time.'* The firms' use of e-mail is summarized in Table 4.6.

Table 4.6: Summary of e-mail use by firms in case study

Firm	Internal Use	Customers	Suppliers	Make purchase/ suppliers	Sell goods
A	Yes	Yes	Yes	Used in the negotiation process	Used in the negotiation process
B	Yes	Yes	No	No	Used in the negotiation process
C	No	Yes	Yes	Yes	No
D	No	No	No	No	No
E	Yes	Yes	Yes	Yes	Yes

Firms A, B, and E currently make use of a public website, with firm A also contributing to a national site that is shared among similar businesses. All of their websites offer customers information on the company, their products, and links to relevant information. Firm C used to have a public website but it contained little beyond a few pictures and the location of the business. Firm A and E are both heavily reliant on their website as it is a key component in their marketing strategy. Firm A states that its website helps attract new customers as well as maintain relationships with existing clients: *'For us, the Internet, more importantly our websites, have changed the way we operate. Almost anyone considering buying a house or hiring a real estate agent starts their search on the MLS site (national site). From there, many visit company websites, so we are reliant on the national site and our site to market our properties and to gain customers.'*

Firm E shares the same reliance as Firm A for marketing its products as the owner states that without the website, the business would be in serious trouble: *'We are extremely reliant on the Web to market our products. The Web allows us to offer tourists substantial information on our packages at low costs. Additionally, the Web has become accepted by tourists as a great tool to learn about places and tours.'* Firm B points out that the Internet is a key piece of their sales strategy and that maintaining a website assists the company in the selling process: *'My position is the Internet does not stand alone from our marketing strategy. Rather, it's a key piece of our overall sales package. We contact a client, then I know that they are calling up our website and probably those of our competitors. So our website has to supplement our sales pitch by offering important information.'*

The only firm that engages in online sales is Firm E, although Firms A and B will negotiate over the Internet and allow customers to phone in orders based on information from their website. This is most likely due to the nature of the products offered by Firms A and B as both involve complex buying decisions with many parts. Firm E is becoming increasingly dependent on online sales as a source of revenue. The owner of Firm E describes this reliance: *'Online sales have taken off in the tourism industry. Our company relies a great deal on repeat customers, and since they have dealt with us in the past, they do not hesitate to order online.'*

One firm, Firm C, started operating a website and stopped after a period of one year. The owner did not choose to integrate it into the company's marketing, and the website itself contained very little information. The owner describes the site as follows: *'...our site was basic, nothing more than where to find us. I was, and am,*

unsure about investing in something speculative when I know what works for our customers. We use newspapers, billboards, and some direct mail. The metrics are easy on these items, and that's what I like.'

Table 4.7 summarizes the firms' use of websites. Please note that Firm C's answers are retrospective and Firm D does not have a website so they are excluded from the table.

Table 4.7: Summary of firm's use of websites

Features	A	B	C	E
Product information	Yes	Yes	Limited	Yes
Contact information	Yes	Yes	Yes	Yes
Map to company	No	No	No	Mapping of tourist destinations
Frequently Asked Questions	Yes	No	No	?
Link to directly e-mail company	Yes	Yes	No	Yes
Ability to take orders via e-mail/telephone	No	Yes	No	Yes
Online purchases	No	No	No	Yes
EDI	No	No	No	No
Review purchases	No	No	No	Yes
Calculate shipping costs	N/A	Yes	No	N/A
Track shipping time	N/A	Yes - relates to company's service	No	N/A
Offer recommendations or suggestions	No	No	No	Yes
Customer reviews	Yes	Yes	No	Yes
Online chat	No	Considering	No	Considering
Interactive/Multi-Media	Yes	No	No	Yes
Human Resource Information/Links	No	Limited	No	No
External access to secure files (internal use – examples include data base of customers, finances, and contracts)	No	No	No	No

In addition to making use of e-mail and websites, some of the firms interviewed made use of other e-commerce technologies, most notably Web browsing, making purchases online, and participating in other online marketing activities. Web browsing was used by Firms A, B, C, and E. All four firms made use of the Web to learn about their competitors, suppliers, and to review industry trends, while firms B

and E also use the Web to engage in market research. Firm B says the large amount of information available on competitors and customers makes the web a great business tool: *'Prior to the Internet, we had to rely on traditional marketing methods to learn about customers and competitors. For customers, we would read the newspaper, stay on top of industry trends, and try to expand our knowledge. We would do the same with competitors, constantly searching for information on what services they offer, who their customers are, anything we could find. Today, we can find ten times the information, in one tenth of the time, by using the Internet.'*

Firm E finds that Web browsing also assists in identifying suppliers and reducing procurement time: *'Without the Internet, we would have to solicit information from a number of suppliers, comparison shop using catalogues, brochures, and telephoning people. But today, we can do all of that online in seconds, and with more and more firms publishing prices, we don't overpay for goods.'*

Firms A, B, C, and E also use the Web to either make direct purchases from suppliers or to view suppliers' products and make purchases using the telephone or fax machine. All four business have found that the using the Web enables them to reduce procurement time and save money. Firm E describes the use of the Web as a time saver in the purchasing process: *'The Internet speeds up the entire purchasing process. We can access everything we need to know in seconds and act upon the information quickly.'* Firm B echoes these comments: *'We use the Web to quickly scan prices and compare products. What I like about the Internet is that (we) can purchase almost anything (we) are looking for, from stationary to parts for trucks to hotel rooms, when we are making sales calls. Its saves time, and more importantly, money.'*

Other uses of the Internet vary significantly between companies. Firms A and E occasionally make use of online newsletters or brochures. Only Firm E invests in online marketing via paying search engines for prime positioning when search results are displayed. None of the firms use the Internet for online banking above and beyond the processing of orders that they receive via the Internet, telephone, or e-mail. Additionally, the firms make little to no use of the Internet for internal purposes, such as Human Resource management, integration of information, and inventory management.

4.4 Summary and impact on quantitative survey

In summary, the main types of e-commerce technologies used in Atlantic Canadian SMEs are e-mail, use of public website for marketing purposes, including some online sales, web browsing, and procurement of supplies. These activities are included in the larger quantitative survey that measures Web use, as they have been deemed to be important to the majority, if not all, of the SMEs interviewed. Furthermore, the survey includes a selection of questions that relate to the use of the company's public website, as this will assist the researcher into gaining further insight in the use of e-commerce by Atlantic Canadian SMEs. Based on the interviews, the survey includes questions pertaining to the content of a firm's website, interactivity of the website, ability of the website to process and/or assist online transactions, and the use of multimedia. These questions have been justified in the pilot interviews, as these features are used or being considered for use by the majority of firms interviewed that publish a public website.

4.5 Facilitators and barriers of e-commerce

This section will review the facilitators and barriers of e-commerce in the context of explaining past adoption and future adoption intentions. The review resulted in an emergence of several trends. These trends can be categorized into the following:

Usefulness
Owner's characteristics
Use by competitors/industry leaders
Ease of Use

The following section will examine the main facilitators and barriers identified and will conclude with a discussion of the impact of the pilot interviews on confirming or modifying the model proposed in Chapter 2.

4.5.1 Usefulness

The usefulness of e-commerce and the perception that future e-commerce adoption will be useful to the firm were the two main facilitators identified in the interviews. Firms A, B, C, and E all noted that the benefits or the potential benefits associated with e-commerce were and are the main motivators to adopt the technology. In addition, the one firm that has yet to adopt e-commerce, Firm D, has noted that the lack of perceived usefulness is the main reason that it has not adopted the technology.

When interviewing the firms, A, B, and E all noted that e-commerce has resulted in significant cost savings, improved communication, and improved profits. Firm E illustrates this point*: 'E-commerce has been great for our company. Almost every aspect of e-commerce that we use has resulted in some tangible benefit to our company. It has resulted in reduced costs and improved sales and profits.'* Table 4.8 includes samples of comments made in the interviews that relate to the usefulness of the technology as a facilitator or barrier of adoption.

Table 4.8: Comments on the perception of usefulness of e-commerce in adoption decisions

Firm A	'The biggest motivator for adopting e-commerce and the Internet is how helpful it has been to our business. Originally, we started with a small investment, but when we saw the benefits from just using e-mail and the national website, we increased our commitment. Any future investment depends on whether we can see it helping our business.'
Firm B	'I thought, and think, the Internet is going to transform business as it offers vastly superior business tools compared to anything I have ever seen. How can you not adopt something that is so beneficial?'
Firm C	'We use the Net because my employees find it helpful in their day to day activity. I would consider expanding our use only of it made business sense.'
Firm D	'The main reason why we don't use the Internet is (that) I am not sure it will help our business. I am comfortable where we are in terms of customer numbers and profits. It may help us with our younger customers, and I am considering it, but am not convinced.'
Firm E	'The biggest motivator for adopting the Internet is how helpful its been to our business. As new uses of the Internet emerge, we would consider them due to our past successes.'

4.5.2 Owner's characteristics

Owners who were interested in e-commerce, were knowledgeable, and were quick to adopt technology (Innovativeness) were more likely to have adopted or considered adopting e-commerce technology. While Usefulness was the most consistent facilitator, Owner's Characteristics were also frequently mentioned as an explanation of adoption and a motivator of future adoption. The owner of Firm B describes his personal interest in technology and how it has resulted in an increased use of e-commerce in his business: *'I love anything technical. I was using the Internet for personal use when many people did not even know what it was. As more and more business applications became available I naturally gravitated towards them. As far as local competitors go, we are way ahead of them in using technology, and my intentions are to make sure we stay there.'* The owner's comments are essentially echoed by Firm E: *'I have always tried to incorporate new technology in my business. We started using a computer very early in our business for word processing, database management, and then accounting, and we had luck with them. I think you have to be willing to embrace change.'*

Discussing barriers to e-commerce, Firms C and D make very little to no use of technology in their business and both owners are quite hesitant to adopt technology and have little knowledge in the area. Firm D describes this: *'I don't like computers; I had to use them at my previous job and found that they added to my workload. I find that I can keep track of things much more efficiently by not using them.'* Table 4.9 includes samples of comments made in the interviews that relate to Owner's Characteristics as a facilitator of or barrier to adoption.

Table 4.9: Comments on owner's characteristics as a facilitator or barrier to adoption

Firm A	'While I don't love technology, I am far from afraid of it. I like my cell phone, my Blackberry (wireless device) even better, and enjoy surfing the Net. As long as it is beneficial, then I will use it.' 'I have a business degree and am comfortable using basic software. I find the Internet easy to use and when I combine common sense with past experience, I can teach myself almost any software or computer program.'
Firm C	'My computer knowledge is basically zero, and as a result, I never warmed up to using the Internet and e-commerce.'
Firm E	'I find the more I know about technology, the easier my life is. Learning about the Internet and its many uses has been a treat for me.' 'While I never formally studied computers, I self taught myself Word Perfect and several accounting programs. My computer knowledge is pretty good, all things considered.'

4.5.3 Use by competitors/industry leaders

The majority of firms that have adopted e-commerce technologies noted that they paid attention to competitors and industry leaders both prior to and after making adoption decisions. Firm E states that the industry was embracing e-commerce and they saw adopting it as not only a part of their strategy but something that was inevitable if they wanted to survive. *'Our entire industry moved so quickly to embrace the Net. While we recognized the value of adopting e-commerce early on,*

we might not have moved so fast if the entire industry, including some of our larger regional competitors, did not jump on the bandwagon.' Table 4.10 includes samples of comments made in the interviews that relate to Internet use by competitors and industry leaders as a facilitator of adoption.

Table 4.10: Comments on the use of e-commerce by competitors/industry leaders as facilitators of adoption

Firm A	'The larger local firms started adopting the Internet, and we followed suit. At a certain point in time, we started to even pass some of the first movers, and today we would be considered quite innovative. This is something we are proud of.'
Firm B	'While my business is large locally, midsized regionally, and small nationally I always want to be one step ahead of everyone. Look at our Internet us; we are doing things that companies five times our size aren't doing – our drivers love it, I love it, and so do our customers.'

4.5.4 Ease of Use

The ability to use e-commerce technology has been consistently identified as a consideration in the adoption process during the pilot interviews. Firms A, B, and E all state that the ease of use of e-commerce, especially the first technologies, led to further adoptions. Firms A and E noted the ease of use of the Internet positively affected the extent of their adoption. In addition, all of the firms state that they would consider the complexity of any new technology prior to making a final adoption decision.

The firms' employees were also mentioned frequently when the owners discussed the ease of use of e-commerce technology and their thoughts on expanding their current usage. Generally speaking, firms that employed computer/Internet knowledgeable employees were less hesitant to adopt further technologies. Table 4.11 includes samples of comments made in the interviews that relate to the ease of use as a facilitator and/or barrier of adoption.

Table 4.11: Comments on the ease of use of the Internet as a facilitator and/or barrier

Firm B	'I employ truck drivers,. Most do not have any formal education, and when I first thought about whether to adopt e-commerce, I was concerned (they may not) be able to use it. But after thinking about it and explaining it to them, the majority (have) embraced the technology. Almost all the truck stops have Internet access and computers now, as the technology is being used by everyone.'
Firm D	'I find computers hard to use. I never really embraced them. It might have been that when they first came out, even typing and printing something was a big ordeal. For me, if I am ever going to adopt the Internet for my business, it is going to have to be simple.
Firm E	'When we consider adopting additional technology, we always consider a number of factors. First, what are the cost-benefits of adopting, what can happen negatively if we don't, and will our employees want to use the technology?' '…Luckily, for our business, we employ a great deal of university students who know a fair bit about technology and the Internet. So, we rarely have to worry about employee training or employee dissatisfaction. Anything new that is becoming mainstream, they (employees) can't wait for us to adopt it. It's the youth generation today, educated and high tech.'

4.6 Summary of facilitators and barriers of e-commerce

In summary, the main facilitators of e-commerce adoption that arose in the comprehensive pilot interviews were 1) how beneficial or useful the technology will be to the firm; 2) the owner's personal characteristics, including his/her computer knowledge and desire to innovate; 3) influence of others, especially peers and competitors; and 4) ease of use of the technology. The barriers identified were identical to the facilitators with the exception being that they operated in reverse. For example, some firms did not adopt e-commerce or enhance their adoption levels because they did not think it would be useful, CEOs lacked knowledge or were not innovative, there was a lack of influence from peers and competitors, and/or the firm's decision makers perceived the technology as not being easy to use.

4.7 Impact of the interviews on the research

The interviews with SME owners impacted the research in a number of ways. As discussed in Section 4.4, the interviews assisted the researcher in identifying which e-commerce technologies are used in Atlantic Canada and therefore justify a segment in the survey. This supports one of the goals of the research, which is to understand the use of e-commerce among Atlantic Canadian SMEs. As seen below, the pilot interviews also assisted in confirming the proposed model that was discussed in Chapter 2. Furthermore, the interviews assisted the researcher by confirming important aspects of the research methodology, including that SMEs in Atlantic Canada adopt e-commerce in stages and that decision making in SMEs is highly centralized.

4.7.1 Justifying the proposed model

The the pilot interviews assisted in justifying the proposed model that was developed in Chapter 2. The proposed model posited that behavioural intentions to adopt additional e-commerce technologies and adoption to date can be explained by the following variables:

CEO Innovativeness:	the CEO's interest in and willingness to try experimenting with new technologies.
CEO Knowledge:	the CEO's perception of his/her knowledge vis-à-vis that of peers, as well as his/her perceived overall level of knowledge about Internet technology.
Employee Knowledge:	the owner's perception of his/her employees' overall knowledge about computers, from computer literacy through to computer expert.
Performance Expectancy:	the degree to which an individual believes that using e-commerce/Internet technologies will enhance the productivity, efficiency, and/or profitability of his/her firm.
Effort Expectancy:	the ease of use associated with using e-commerce/Internet technologies.
Social Influence:	the degree to which an individual perceives it is important that others believe he/she should use e-commerce/Internet technologies.
Size:	larger firms are more likely to adopt e-commerce/Internet technology and make more sophisticated use of them.

As evident in Section 4.5, the results of the interviews supported the proposed model as outlined in the literature review. There was consistent support for the inclusion of CEO characteristics in Section 4.5.2, especially knowledge and innovativeness. Performance expectancy relates to the usefulness and the perception of usefulness/benefits of e-commerce, which received the most consistent support in the pilot interviews as seen in Section 4.5.1. Consistent comments by interviewees in Section 4.5.4 provided justification for the inclusion of Effort expectancy. Social influence was supported by the statements noting the influence of copmpetitors and/or industry leaders as seen in Section 4.5.3. The variable employee knowledge was commonly mentioned in relation to the ease of use of e-commerce technologies, both as a facilitator and as a barrier. Thus the initial pilot study interviews resulted in confirmation of the proposed model.

The pilot interviews also confirmed the omission of some variables that were originally considered in the proposed model, including the following:

Facilitating conditions:	the degree to which a person believes the firm has the organizational and technological infrastructure to support and use the system.
Vendor/consultant support:	the positive influence vendors and/or consultants can have on e-commerce adoption.

Originally, facilitating conditions was omitted from inclusion in the model, as previous research did not support its role in predicting behavioural intentions. Furthermore, the exclusion led to a more parsimonious model and a shorter survey, both of which are desirable in research (Zikmund 2003; Talyor & Todd 1995a, b). The researcher planned to reconsider the omission, based on the results from the pilot interviews. Since facilitating conditions refers to a firm having the necessary IT in place to support e-commerce adoption and/or resources such as capital to pay for the adoption, the researcher was curious if facilitating conditions would impact adoption in SMEs in Atlantic Canada. Of particular interest to the researcher was the impact of cost as a facilitating condition due to limited financing options available to SMEs, specifically, Atlantic Canadian SMEs as discussedi n the literature review in Chapter 2, sections 2.4.9, 2.4.11 and 2.9.3. The results from the pilot survey supported the original omission as none of the firms considered the costs associated with the implementation of e-commerce as a major barrier. Firm A describes the impact of cost on adoption as a non-factor: *'We never considered costs when adopting e-commerce. Every office I can think of had a computer prior to the popularity of the Net, and the costs of using e-commerce are very low.'* Firm C similarly states that infrastructure and resources were not a factor in explaining their current use or intentions to adopt additional technologies: *'…one of the only advantages of using the Internet was it cost us almost nothing. I mean, we had computers; an Internet connection costs next to nothing. It's not something (infrastructure/resources) that I gave much thought to.'*

The role of IT vendors or consultants was omitted from the proposed model for parsimony, for the mixed results in support of their inclusion, evidence that their role would be captured in the other constructs, and for the lack of IT consultants/vendors in the Atlantic Canadian region, particularly in rural areas. The results of the pilot interviews confirmed the exclusion of vendors/consultants, as it was not consistently mentioned by any of the firms in the study. The only firm that mentioned the impact of vendors/consultants without encouragement by the interviewer was Firm E, and they noted that there was a lack of knowledgeable consultants in Nova Scotia, which serves as a barrier to adoption. In summary, the variables proposed in Chapter 2 received strong and consistent support during the interviews with SMEs. Thus, their inclusion in the next phase of the research is justified.

4.7.2 Support for SMEs' adopting e-commerce in stages

The literature review in Chapter 2 (See Table 2.5) supported the assertion that SMEs adopt e-commerce in sequential stages, first adopting simple technologies, such as e-mail, and then moving to more sophisticated uses of the Internet. The results of the case-based pilot study provided strong support for this assertion. All of the firms that adopted e-commerce in the interviews did so in sequential stages. Firm A describes this process: *'We first adopted e-mail and then started to participate in a national*

website (public website) provided by our governing body (national). As we learned more about the Net, we started to try other things and eventually expanded our use.'

4.7.3 Confirmation of centralized management

As proposed in Chapters 2 and 3, the interviews confirmed that the majority of decisions in Atlantic Canadian SMEs were usually made by the owner of the firm. All of the firms that participated in the survey indicated that almost all decisions, especially important decisions, such as the adoption of technology, were usually made by the owner/manager. Even when a partnership exists (Firm A) or the firm is structured as a corporation (Firm E), there remains one primary decision maker. The confirmation of a primary decision maker operating in a centralized fashion provides justification for only surveying the owner/CEO of the firm or a designate as outlined in the Research Methodology chapter.

4.8 Pre-testing the questionnaire

The participants in the interview were presented with a proposed questionnaire that serves as the basis for the second pilot study. The interviewer asked them the survey questions and filled in the survey on their behalf. After completing the survey, the owners were asked if they understood the questions, if they were interested in the survey, if the sequencing was acceptable, and if the survey was an appropriate length. All of the participants stated that the survey was acceptable and offered very little in the form of suggested changes. The only consistent criticism was that the survey was too long. As a result of their work, the survey was shortened slightly by removing some of the questions pertaining to the uses of e-commerce. The only questions that were removed were related to e-commerce uses that are uncommon in Canada, as evident in the literature review and in the first pilot study. No other changes occurred, except minor wording changes to some questions.

4.9 Second pilot study – Survey of SMEs

The first case-based pilot study assisted the researcher in justifying the proposed model introduced in the literature review and assisted in refining the questionnaire. A scaled-down version of the full study was then carried out to further pre-test the questionnaire, justify the research model, and complete a scaled down data analysis. The data analysis section (Appendix D) contains a condensed analysis and a minor discussion about the subsequent findings, as the goal was not to determine the appropriateness of the model but to determine if the statistical analysis techniques were appropriate. The following section will present the impact the second pilot study had on the research. In Section 4.10 the questionnaire and the data collection technique is discussed, Section 4.11 examines the impact of the survey's data analysis on the model and Section 4.12 addresses the influence of the analysis on the statistical techniques. The chapter concludes with a review of the implications of the second pilot-study on the research and a presentation of the final model that was used in the full survey (Section 4.13) followed by a summary in Section 4.14.

4.10 Pre-testing the questionnaire

The majority of respondents indicated that there were very few problems with the questionnaire or the data collection technique (telephone). The majority of

respondents indicated that they thought the questionnaire was very detailed, left nothing out and that telephone technique was very appropriate for reaching the target audience. Since the survey instrument was adopted from previous research as indicated in Chapter 2, Section 2.10.2 this was expected. Based on comments from some participants, the researcher decided to add two questions to the demographic section. The first question added deals with gross sales as some respondents indicated a willingness to share this information. The second question deals with the total time respondents spent with the firm, as compared to current time in position as some people noted there was a significant difference between the two.

The only negative comments regarding the questionnaire was that it was lengthy and fairly time consuming to complete (15 – 30 minutes). Given that the respondents stated that they understood the questions, did not find anything ambiguous, and were glad to participate, a decision was made to duplicate the questionnaire used in the pilot study.

4.11 Impact of the data analysis on the model

The data analysis section results must be considered in light of the small sample size, which falls well below the recommended limit for the statistical techniques used. However, as illustrated in Appendix D, the model did receive support for its ability to explain the variance in owner-managers behavioural intensity to adopt e-commerce using multiple regression on factor scores (R^2_a=.361), discriminant analysis (nonconclusive), and multiple regression(R^2_a=.83), without completing preliminary factor analysis. The results of the model in explaining current levels of e-commerce were much less impressive, as the model failed to explain variance (R^2_a=-.047). As the main goal of the research was to explain intentions to adopt or to adopt more sophisticated e-commerce technologies, the decision was made to leave the model as is. Furthermore, it should be noted the strong support of the model in the case-based pilot study impacted the researcher's decision to leave the model unchanged.

4.12 Impact of the data analysis on research techniques

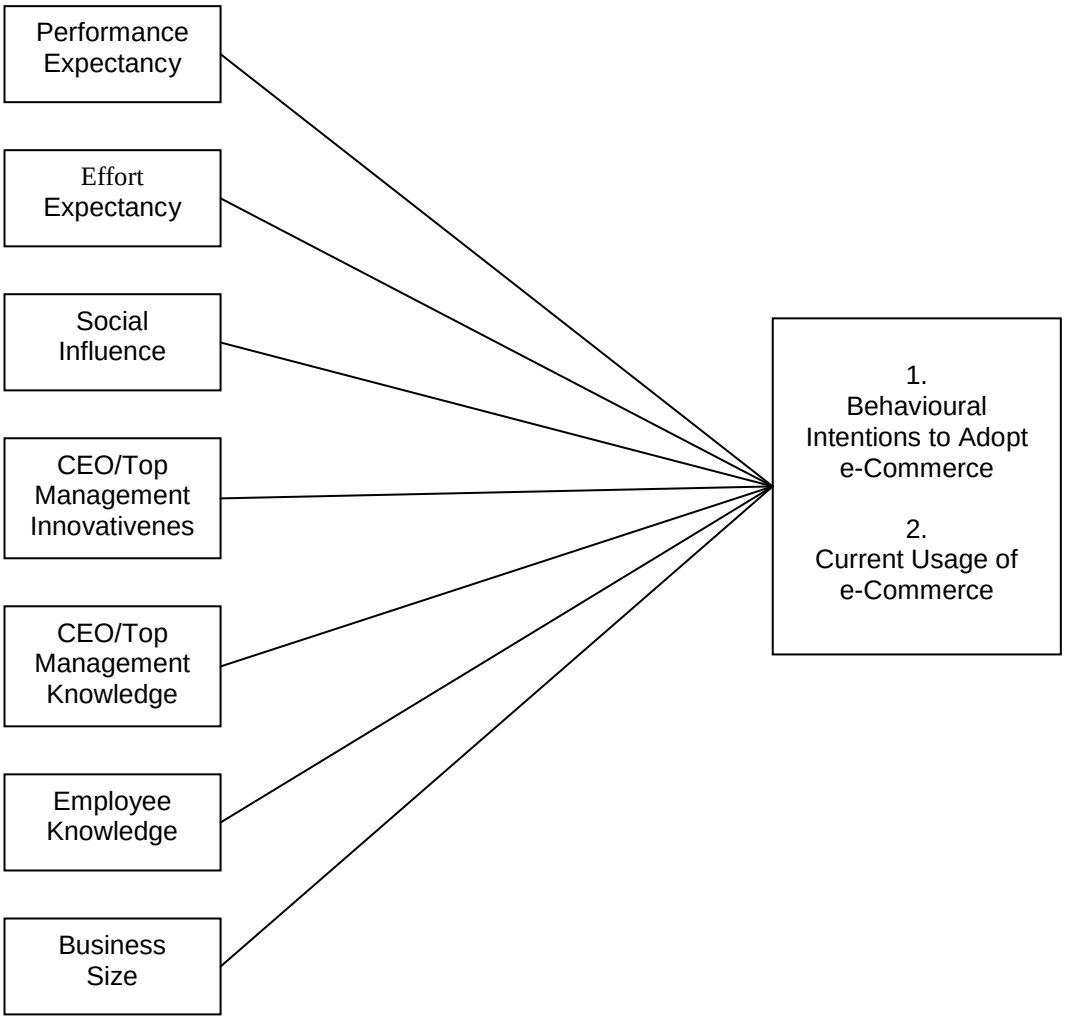
The data analysis techniques were deemed to be appropriate to the research questions and acceptable for this research. As there are a variety of available research techniques, it is important that will result in comparable findings. Many other e-commerce and SME researchers make use of multiple regression (Seyal et al. 2004; Looi 2005; Abdullah 2002; Harrison, Mykytyn, Riemenschneider, 1997) and discriminant analysis (Molla 2005; Lee 2004; Thong 1999), thus making comparisons possible. Furthermore, the researcher is comfortable with these techniques and will use them in the full study.

4.13 Presentation of the Model (final)

The results of the two pilot studies confirm the constructs suggested by the researcher in the preliminary model. As such the model will remain the same as constructed in Chapter 2.

The full preliminary model is as follows:

Figure 4.1: Preliminary Model



4.14 Summary

Chapter 4 presented the results from two pilot studies and a discussion about the impact that these studies had on the research model and methods in the dissertation. The chapter opened with a detailed examination of five case studies and how the interviews affected the final research model and questionnaire. The chapter concluded with a discussion of the pre-test and an examination of its results and implications for the research. A final research model is presented at the end of the chapter which was used in the large scale survey. Chapter 5 will present the results from this large scale survey.

CHAPTER 5: ANALYSIS OF THE LARGE SCALE SURVEY

5.1 Introduction

Chapter 5 focuses on presenting the data analysis of the large scale survey. As discussed in Chapters 1 – 4 the dissertation is examing the extent and nature of e-commerce use among SMEs in Atlantic Canada. Furthermore a research model has been constructed to explain the variance in behavior intentions of SMEs to adopt e-commerce and SMEs' current use of e-commerce.

In Chapter 3, the research design and survey methodology were provided along with a description of the data analysis techniques. Chapter 4 provided information on two pilot studies and how they contributed to the research model and the final survey questionnaire. In turn, this chapter reports on the large scale telephone survey.

This chapter starts with a discussion of the survey responses in Section 5.2 and is followed by a report on non-response bias in Section 5.3. The respondents are described in the demographic Section, 5.4. This section reviews such things as the categories of business, the position in the firm held by the respondent, and the size of the firm. Sections 5.5 and 5.6 review the nature and extent of the firm's e-commerce adoption. The respondents' level of current e-commerce use is reported in 5.6, and their intentions to adopt further technology are noted in 5.8. Section 5.9 reviews the respondents' perceptions with regard to the predictors in the proposed model. This is followed by Sections 5.10 through 5.12, which illustrate the results from the data analysis, followed by a summary in Section 5.13.

5.2 Survey response

A total of 1,836 telephone calls were made in order to obtain an adequate response rate. In order to complete the survey, firms were contacted in advance and screened for suitability following the procedures outline in Chapter 3. The survey was directed toward SME owners or CEOs, but they could appoint someone whom they considered to be a qualified designate to complete the survey. In order to be considered suitable, firms had to have fewer than 200 full time employees, and the person completing the survey had to perceive that they had at least 50% influence over e-commerce adoption decisions in the firm. Once it was determined that the firm and the respondent were suitable, the survey was then completed, or an arrangement was made to complete the survey at a specific date and time.

Firms were selected to participate in the study via a random draw from the Yellow Page® listings. The random draw allowed for the inclusion of a variety of companies across a number of different industries. Each randomly drawn firm was called five times, prior to moving on to another randomly drawn participant. Of the 1,836 firms contacted, 181 failed to meet the criteria for the study outlined above. Of the remaining 1655 firms, 289 completed the survey, resulting in a response rate of 17%.

5.3 Non-response bias

As discussed in the Research Methodology chapter, one of the potential limitations of the research is non-response bias. An acceptable method of checking for non-response bias in telephone surveys is to compare demographic information from respondents to the demographics of the target population (Zikmund 2003; MacGregor & Gomes 1999). The researcher decided to compare the respondents' geographical locations, to determine if they were representative of the population of the Atlantic Canadian provinces. Also compared were the participants' categories of business, age of firms, and number of employees. The comparisons were made by simply comparing the results to see if any of the percentages in the survey were different from the region. A further comparison was made using a z-test, which is appropriate for comparing percentages from the same population, when the sample sizes are known (Sincich 1995).

As indicated in the demographics Section (5.4) of this chapter, 39.1% of the participating firms came from Nova Scotia, 28.4% from New Brunswick; 23.5% from Newfoundland, and 9% from Prince Edward Island. This regional representation provides a comparable representation to the population distribution of the Atlantic Canadian provinces, which is reported as 40% for Nova Scotia, 31% for New Brunswick, 25% for Newfoundland, and 5.5% for Prince Edward Island.

The comparisons for business categories were somewhat difficult to make, as the various government agencies/boards, such as Statistics Canada, Industry Canada, and the Atlantic Canada Opportunities Agency, do not make use of uniform categories. Thus a comparison was made based on information from Statistics Canada in categories that duplicated those used in the survey. The respondents in the survey indicated that 40.5% were operating in the service industry, 18% in retail business, and 2.1% in finance firms. Results from Statistics Canada revealed that 46.3% of businesses operate in the service industry, 15.5% are retail businesses, and 1.7% are classified as finance firms.

The comparison of age of the firm produced very similar results. Respondents in the research indicated that the majority (77.5%) of their firms had been in operation for more than 10 years. This compares to results reported by the Atlantic Canada Opportunities Agency stating that 81.1% of businesses report being in operation more than 10 years.

Respondents to the survey reported that 96% of businesses had less than 100 employees, compared to 94.8% published by Statistics Canada.

As evident in the comparisons, there is little difference between the two groups, and as such, non-response bias does not appear to be a factor in the dissertation. To further confirm the absence of non-response bias, the researcher conducted several z-tests on the data. As stated previously, the use of z-tests is considered appropriate when comparing percentages when the sample sizes are known and the samples exceed 30 (Sincich 1995). The results from the z-test, using a 95% confidence interval ($z = 1.96$) (Table 5.1), indicate that the only significant difference between the actual population and the sample relates to geographical location of the SMEs and the categories of business. Prince Edward Island appears to be slightly over-weighted in the sample ($z = 2.08$), but this was determined not to be a factor, as the

geography and demographics of Prince Edward Island are quite similar to those of New Brunswick and Nova Scotia. In addition, the researcher is interested in Atlantic Canada as a region, not individual provinces. The z-test for categories of business also indicated significant differences, with the service industry being under-weighted in the sample (z = -2.01). Upon further investigation, the researcher determined this had more to do with differences in the classification of businesses in this researcher's sample, as he classified some firms as 'others' that Statistics Canada included in their classification of service firms. When the 'other' firms in the researcher's study were reconsidered as services firms, there was no significant difference found. Thus the researcher can conclude that non-response bias was not a factor in the dissertation.

Table 5.1: Comparisons of the population of the survey to the region as a whole

Population - Provinces	Survey Population	Regional Population	Z[1]	Significance
Nova Scotia	39.1	40	-0.31	Non Significant
New Brunswick	28.4	31	-0.98	Non Significant
Newfoundland	23.5	25	-0.60	Non Significant
Prince Edward Island	9	5.5	2.08	Significant
Categories of Business				
Service	40.5	46.3	-2.01	Significant
Retail	18	15.5	1.10	Non Significant
Finance	2.1	1.7	0.47	Non Significant
Years in Business				
10 years plus	77.5	81.1	-1.46	Non Significant
Number of employees				
Less than 100	96	94.8	1.04	Non Significant
[1] z (95%) = 1.96				

5.4 Demographic information (Q30 – 40)

The following section describes the demographic information of the respondents. The presentation of the demographic information can assist in the understanding of the research.

5.4.1 Geographical information (Q30)

The survey covered SMEs from the four Atlantic Provinces: New Brunswick, Newfoundland, Nova Scotia, and Prince Edward Island (see Table 5.2). The table indicates that the Nova Scotia had the highest representation in the sample (39.1%), followed by New Brunswick at 28.4%. The breakdown in geographical representation roughly reflects the breakdown in population for the region as a whole.

Table 5.2: Province Breakdown

	Number	Percent
Nova Scotia	113	39.1%
New Brunswick	82	28.4%
Prince Edward Island	26	9.0%
Newfoundland/Labrador	68	23.5%
Total	289	100.0%
Sample size = 289		

5.4.2 Business category (Q31)

Responses came from businesses that classified themselves as operating in a number of diverse fields. The largest category of SMEs in this study represents the Services industry (40.5%), followed by Retail (18.0%) and then Manufacturing (11.1%). This range of businesses surveyed was in keeping with the goal of the study, to survey SMEs from a variety of business categories that represent the population of Atlantic Canada. See Table 5.3 for a summary of business categories.

Table 5.3: Business Category

	Number	Percent
Services	117	40.5%
Retail	52	18.0%
Manufacturing	32	11.1%
Tourism	27	9.3%
Other	20	6.9%
Not-for-profit	17	5.9%
Communications	8	2.8%
Finance	6	2.1%
Oil and gas	5	1.7%
Advertising	4	1.4%
Total	288	100.0%
Sample size = 289		
Other categories included the following: consulting services (2), distribution (3) educational facility (2), agriculture (3), health and wellness (1), industrial retail (1), information technology (1), neurological research (1), graphic design 3), professional association (1), renovation/construction (1), arts and culture (1).		

5.4.3 Age of the firm (Q32)

Respondents indicated that the majority of the firms (88%) have been in business for more than eight years, with 77.5% of the businesses operating for more than 10 years. These results indicate that the businesses in the survey would be classified as

mature, with only 4.8% being in business less than three years. See Table 5.4 for a summary of information on the age of firms in the survey.

Table 5.4: Age of the firm

		Number	Percent
Valid	Less than one year	1	.3
	1 to 3 years	13	4.5
	4 to 7 years	19	6.6
	8 to 10 years	30	10.4
	More than 10 years	224	77.5
	Total	287	99.3
	Non-Response	2	.7
Total		289	100.0

5.4.4 Size of the firm (Q33)

Most firms would be classified as micro businesses or businesses with fewer than five employees (47.1%). In fact, 82.8% of firms indicate that they have less than 20 employees, and only 3.1% of SMEs state that they have between 100 – 200 employees (See Table 5.5). The large percentage of small firms was expected, as it is reflective of the demographics of the region.

Table 5.5: Size of the firm

		Number	Percent
Valid	Less than five	136	47.1
	6 to 10	67	23.2
	11 to 20	36	12.5
	21 to 50	25	8.7
	51 to 99	13	4.5
	100 to 150	7	2.4
	151 to 200	2	.7
	Total	286	99.0
	Non-Response	3	1.0
Total		289	100.0

5.4.5 Gross sales (Q34)

Gross sales for the firms were spread out over the range of categories in the survey. While 24.9% of firms indicated that they had gross sales less than $250,000, another 20.8% of SMEs stated that their gross sales exceeded $750,000 (See Table 5.6 for a summary of gross sales). As previously stated in the both the Literature Review and Research Methodology chapters, it was expected that many firms would fail to answer this question, and 40.5% of SMEs decided not to respond.

Table 5.6: Gross sales

		Frequency	Percent
Valid	Under $50,000	26	9.0
	From $50,000 to under $100,000	15	5.2
	From $100,000 to under $250,000	31	10.7
	From $250,000 to under $500,000	23	8.0
	From $500,000 to under $750,000	17	5.9
	From $750,000 to under $1 million	19	6.6
	From $1 million to under $2.5 million	22	7.6
	$2.5 million and over	19	6.6
	Total	172	59.5
	Non-Response	117	40.5
	Total	289	100.0

5.4.6 Positions held by respondents and influences on e-commerce adoption decisions (Q35, Q29)

The survey initially targeted owners or CEOs of firms, in order to ensure that the respondent was in a position to exercise authority or influence over e-commerce adoption decisions. Owners or CEOs were asked to state their degree of influence as a percent of e-commerce decision making. Thus, an owner who states he/she has 100% influence on e-commerce adoption decisions would be considered the only decision maker, while an person who notes he/she exercises 50% influence on e-commerce decisions would be a moderate influencer. The cut off, as stated in the Research Methodology chapter, was 50%, meaning that any owner/CEO who stated that they exercised less than 50% influence on these decisions was not surveyed. If the owner or principal manager was not active in decision making or felt someone else in the firm was better suited to respond to survey questions, then this designate was considered acceptable.

The majority of respondents to the survey were owners or CEOs (52.9%), followed by other managers at 36.3% (see Table 5.7) and others at 6.2%. The most common other positions included office administrators, general organizers, or administrative assistant. Those interviewed indicated that they had influence over the adoption of the e-commerce in their firms. On a scale of 0% to 100%, the average influence was 78.0%. This indicates that the respondents were, in fact, principal decision makers in the firm.

Table 5.7: Positions held by respondents and influences in E-commerce adoption decisions

		Number	Percent
Valid	Owner/CEO	153	52.9
	IT Manager	9	3.1
	Other manager	105	36.3
	Other	18	6.2
	Total	286	99.0
	Non-Response	4	1.3
Total		289	100.0

5.4.7 Time respondents held current position (Q36)

The majority of respondents stated that they had been in their current position for more than eight years (54.0%), with 42.6% of those surveyed indicating that they have been with their company for more than 10 years. See Table 5.8 for a summary of time respondents have been in their current position.

Table 5.8: Time respondents held current positions

		Number	Percent
Valid	Less than one year	21	7.3
	1 to 3 years	46	15.9
	4 to 7 years	63	21.8
	8 to 10 years	33	11.4
	Over ten years	123	42.6
	Total	286	99.0
		3	1.0
Total		289	100.0

5.4.8 Time respondents spent with company (Q37)

When asked about the total time with the company, respondents indicated that almost half have been with the same company for more than 10 years (49.8%). The second largest group of respondents fell into the four to seven year category (20.8%), followed by the eight to ten year category (11.8%).

Table 5.9: Time respondents spent with company

		Number	Percent
Valid	Less than one year	19	6.6
	1 to 3 years	29	10.0
	4 to 7 years	60	20.8
	8 to 10 years	34	11.8
	More than 10 years	144	49.8
	Total	286	99.0
	Non-Response	3	1.0
Total		289	100.0

5.4.9 Gender of respondents (Q38)

The majority of respondents indicated that they were male (50.9%), with 42.9% indicating that they were female. Some respondents refused to answer the question (6.2%), and the researcher did not feel comfortable selecting either male or female based on the respondent's tone. See Table 5.10 for a summary of the gender of respondents.

Table 5.10: Gender of respondents

		Number	Percent
Valid	Male	147	50.9
	Female	124	42.9
	Total	271	93.8
	Non-Response	18	6.2
Total		289	100.0

5.4.10 Education level of respondents (Q39)

The majority of respondents indicated that they received some type of formal education beyond high school, with 84.8% stating that they furthered their education at a university or community college. The largest group of respondents (42.2%) had a university degree, followed by 20.1% who received a community college designation, 14.2% attending university but not graduating, 5.2% with a Masters degree or higher, and 3.1% who attended some community college. See Table 5.11 for a summary of the education levels of respondents.

Table 5.11: Education level of respondents

		Number	Percent
Valid	Some high school	7	2.4
	High school	34	11.8
	Some community college	9	3.1
	Community college	58	20.1
	Some university	41	14.2
	University bachelors degree	122	42.2
	Master's degree	15	5.2
	Total	286	99.0
	Non-Response	3	1.0
Total		289	100.0

5.4.11 Age of respondents (Q40)

The majority of respondents were 35 years or older (78.6%), with most ranging in age from 35 to 54 (60.6%), especially between the ages of 45 and 54 (36.0%). See Table 5.12 for a summary of the age of respondents.

Table 5.12: Age of respondents

		Number	Percent
Valid	Under 25	13	4.5
	25 to 34	46	15.9
	35 to 44	71	24.6
	45 to 54	104	36.0
	55 to 64	46	15.9
	65 and over	6	2.1
	Total	286	99.0
	Non-Response	3	1.0
Total		289	100.0

5.4.12 Conclusion of demographic information

The demographic results from the survey indicate that the majority of businesses are small SMEs, with fewer than 20 employees, although the range of gross sales for these firms is spread out over several categories. Most firms would be considered mature businesses, as they have been in operation for over 10 years and survey respondents are most likely to be educated owners or managers who have considerable experience working with their company. The demographics of the survey, as indicated in the Non-Response Bias Section, (5.3) are reflective of the demographics of the region.

5.5 Nature and extent of E-commerce use (Q1)

In order to gain an understanding of the use of e-commerce in SMEs, respondents were asked to indicate if their firm did or did not use a specific e-commerce technology. Respondents who answered yes to the questions were then asked about their frequency of use on a scale of 1 – 7, with the number 1 indicating extremely infrequent use of the technology and number 7 indicating extremely frequent use of the technology. The nature and extent of e-commerce use is examined in the following categories: email, web browsing, purchases, and the sale of goods online.

5.5.1 Email use in firms (Q1.1 – 1.3)

Respondents indicated that email was commonly used in SMEs, with 88.8% indicating that they used the technology with customers, 78.2% with suppliers, and 65.0% to communicate within their firm. When asked about the frequency of email use, firms indicated that they made frequent use of the technology within the firm (M = 6.226), with customers (M = 5.732), and with suppliers (M = 5.196). See Table 5.13 for a summary of email use within firms.

Table 5.13: Use of e-mail in SMEs

Email use			Frequency of Use of Function				
Function	Number	Percent	Number	Min-imum	Max-imum	Mean	Std. Dev-iation
Use email within the company.	186	65.0%	186	1	7	6.226	1.353
Use email with customers.	254	88.8%	254	1	7	5.732	1.529
Use email with suppliers.	226	78.2%	225	1	7	5.196	1.770

5.5.2 Web browsing (Q1.4 – 1.6)

Firms indicated that, for the most part, they did engage in Web browsing. The largest percentage of SMEs stated that they browse the Web searching for information on suppliers (75.9%), with fewer companies using the Web to learn about competitors (55.2%) or customers (54.7%). When asked about their frequency of use, firms described their use as slightly frequent, with browsing for supplier information being the most frequently used browsing activity (M = 5.204), followed by browsing for competitor information (M = 5.089) and browsing for customer information (M = 4.636). See Table 5.14 for a summary of overall use of IT in SMEs.

Table 5.14: Use of Web Browsing in SMEs

			Frequency of Use of Function				
Function	Number	Percent	Number	Min-imum	Max-imum	Mean	Std. Deviation
Browse web for information on competitors.	158	55.2%	157	1	7	5.089	1.834
Browse web for information on customers.	158	54.7%	173	1	7	4.636	1.836
Browse web for information on suppliers.	217	75.9%	216	1	7	5.204	1.557

5.5.3 Using the Internet to make purchases (Q1.7 – 1.9)

When asked about making purchases through the Internet, 71.3% of respondents indicated that they use the Internet to source information and to complete the purchase online or by using email or the telephone. The portion of firms that make purchases completely online, including order placement and payment, is less at 53.8%. SMEs indicated that only 45.8% engaged in EDI. While firms engage in making purchases from the Internet, the frequency of such purchases can be described as neither frequent nor infrequent, with purchases being made on the Internet and subsequently being completed using other technology at M = 4.657. Firms that complete transactions entirely online reported a slightly lower frequency, at M = 4.195. Firms that engage in EDI, while making up a smaller percentage of

users, do make use of the technology more frequently, at M = 4.954. See Table 5.15 for a summary of firms' use of the Internet to make purchases.

Table 5.15: Use of e-commerce in Purchasing in SMEs

			Frequency of Use of Function				
Function	**Num-ber**	**Percent**	**Num-ber**	**Min-imum**	**Max-imum**	**Mean**	**Std. Deviation**
Make purchases via the Internet via telephone or email.	204	71.3%	204	1	7	4.657	1.814
Make transactions completely online, including the placing of the order and payment.	154	53.8%	154	1	7	4.195	1.924
Electronic Data Interchange (EDI).	131	45.8%	129	1	7	4.954	1.615

5.5.4 Selling goods and services using the Internet (Q1.9 – 1.11)

Fewer than half of the firms (44.1%) reported that they engaged in any online selling of goods and service. This number was further reduced to 22.4% when SMEs were asked if they allow customers to complete full transactions online, including the placement of orders and the processing of payment. A smaller number of SMEs participated in online auctions (17.8%). The frequency of selling goods online could be described as slightly frequently to neutral for SMEs that allow customers to email or phone in orders (M = 4.837), neither frequently nor infrequently for firms that complete full transactions online (M = 4.453), and slightly infrequent to neither frequently nor infrequently for SMEs that sell goods using online auctions (M = 3.769). See Table 5.16 for a full summary of results for SMEs that sell goods or services using e-commerce.

Table 5.16: Use of e-commerce by SMEs to Sell Goods and Services

			Frequency of Use of Function				
Function	**Number**	**Percent**	**Number**	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Sell goods through the Internet by allowing customers to phone or email orders.	126	44.1%	123	1	7	4.837	1.844
Complete full transactions using the Internet, including order acceptance and processing payment.	64	22.4%	64	1	7	4.453	2.174
Participate in online auctions.	51	17.8%	52	1	7	3.769	2.139

5.5.5 Conclusions about SMEs E-commerce use

While SMEs are using e-commerce in Atlantic Canada, their use of the technology is limited. The majority of SMEs appear to restrict their activities to email and web browsing, with only a small percentage of the firms engaging in online procurement or selling goods online.

5.6 Website use and functions (Q2)

To gain further insight into the use of e-commerce in firms, respondents were asked if they had a website for their business. Those that did have a website were then asked a series of questions about the site's features. The majority of firms in the sample indicated that they did have a website (63.3%). See Table 5.17 for a summary of firms that do and do not have a website.

Table 5.17: Website Use

Function	Number	Percent
Have website	183	63.3%
No website	106	36.6%

5.6.1 Website features and functions (Q3)

The web sites used by SMEs contained a great deal of basic information but allowed little buying and selling of goods and made minimal use of multimedia capabilities. Most businesses offer visitors basic features on their website, including contact information for the company (98.4%), information about products and services (95.1%) and applications that allow visitors to email the company directly from their website (94.5%). Of the firms that offered information on products and services, 24.7% made use of multimedia such as video, demonstrations, or interactive presentations.

Some firms did allow for the sale of goods via their website (64.5%), but only 19.3% of websites allowed customers to complete orders and pay for goods entirely online. SMEs offered customers some assistance in making purchases or finding out additional information through Frequently Asked Questions sections (62.3%), but beyond this, the SMEs' websites did not offer substantial features. Respondents indicated that only 36.6% of websites made suggestions to customers, 27.5% allowed customers to track orders, and 14.8% allowed customers to calculate shipping costs and time of arrival.

While some SMEs did encourage customer interaction on their websites, this was limited. Of the SMEs with a website, 30.8% allowed customers to post reviews or information on products, 20.8% had an online bulletin board, and 2.8% had interactive chat.

Table 5.18: Website Features

	Number	Percent
Contact information for the company	180	98.4%
Information about product, including pictures and descriptions	174	95.1%
Allow visitors to email company directly from the website	173	94.5%
Allow customers to use the telephone or an email address to place an order from the website	118	64.5%
Answers to frequently asked questions (FAQ)	114	62.3%
Make recommendations for customer purchases	67	36.6%
Allow customers to post reviews of company products	56	30.8%
Track customers' current and past purchases	47	25.7%
Use multi-media, such as web videos, product demonstrations, etc.	45	24.7%
Provide a bulletin board to post comments on products, the company, etc.	38	20.8%
Allow customers to purchase products directly from the website using a credit card or EDI	35	19.3%
Calculate shipping costs for a product	27	14.8%
Track shipping time of a product	27	14.8%
Have online chat	8	2.8%
Sample size = 289 responded to question about website. Only the firms with a website responded to subsequent questions about website features (n=183).		

5.6.2 Conclusion of webpage use

While the majority of firms do have a website (63.3%), a substantial percentage of SMEs (36.6%) still do not make use of this technology. Of the SMEs that have websites, most of these websites would be classified as simple marketing websites that offer basic information on the business and its products and services. In fact, only 19.3% of SMEs allow customers to finalize and pay for products completely online.

5.7 Level of E-commerce use (Q4)

Respondents were asked to categorize their level of e-commerce use into one of the six stages that was previously presented in the Research Methodology chapter. The most common level was III, representing 31.0% of firms. Only 8.8% had achieved a top ranking of Level VI, while 7.7% indicated that they had no use of e-commerce technologies. The results are summarized in Table 5.19.

Table 5.19: Level/Category of e-commerce Use in SMEs

	Number	Percent
I: No use of e-commerce technology	22	7.7%
II: Using basic Web browsing and email	81	28.5%
III: Maintaining a website for promotional purposes, engaging in email and Internet browsing	88	31.0%
IV: Taking orders via the website and/or making online purchases	53	18.7%
V: Completing online purchasing and selling transaction, making and accepting online payments	15	5.3%
VI: Completing all transactions on the Internet, using an interactive website and personalized webpages for suppliers and buyers	25	8.8%
Total	284	100.0%
Sample size = 289		

5.8 Intentions to adopt more sophisticated e-commerce technologies (Q26 – 28)

The survey asked respondents about their intentions to adopt further or more sophisticated e-commerce technologies, also know as Behavioral Intentions (BI) in the model. All three levels of behavioural intention had nearly identical results, indicating that firms had little intention to adopt more sophisticated technologies in the near future. The results from the three questions are as follows:

- Intend to use the next level of e-commerce technologies in six months (Mean = 2.283, SD = 2.026)
- Predict they will use the next level of e-commerce technologies in six months (Mean = 2.291, SD = 2.045)
- Plan to use the next level of e-commerce technologies in six months (Mean = 2.269, SD = 2.047)

5.9 Model questions (Q5 – 25)

Respondents were then asked a series of questions that pertain to the constructs in the model. The constructs include the following:

- Performance Expectancy
- Effort Expectancy
- Social Influence
- CEO Innovation
- CEO Knowledge
- Employee Knowledge

Each construct was measured using the following scale: 1) Extremely unlikely, 2) Quite unlikely, 3) Slightly unlikely, 4) Neither likely nor unlikely, 5) Slightly likely, 6) Quite likely, and 7) Extremely likely. The ratings of each individual item, in each scale, are presented in this section of the dissertation.

5.9.1 Performance expectancy (Q5 – 8)

Respondents were not convinced that adopting the next level of e-commerce technologies would impact the firm's performance. CEOs were generally unconvinced that they would find the next level of e-commerce technology adoption useful or that it would enhance efficiency, productivity, and profitability. All ratings hovered around the quite unlikely scale value. These results indicate that the decision makers do not perceive the enhancement of e-commerce technologies as beneficial to their firm. The results are summarized in Table 5.20.

Table 5.20 Adoption of e-commerce Technology Scale Questions

Performance Expectancy	Number	Mean	Std. Deviation	Minimum	Maximum
I would find the next level of e-commerce technology useful for my staff and I.	234	3.868	2.224	1	7
Using the next level of e-commerce technology would enable my staff and I to accomplish tasks more quickly.	231	3.576	2.173	1	7
Using the next level of e-commerce technology would increase productivity for my staff and me.	232	3.435	2.123	1	7
If my staff and I use the next level of e-commerce technology, it will increase the profitability of the company.	232	3.500	2.158	1	7
Sample size = 264. 25 firms were already at the highest level of adoption and did not answer this set of questions Scale: 1) Extremely unlikely, 2) Quite unlikely, 3) Slightly unlikely, 4) Neither likely nor unlikely, 5) Slightly likely, 6) Quite likely, 7) Extremely likely					

5.9.2 Effort expectancy (Q9 – 12)

Respondents seemed to have little confidence that their firm could upgrade their e-commerce to the next level of adoption without exerting effort. When it came to expectations about ease of use, understanding, and skills, respondents rated each scale item in the lower scale value range of slightly likely. The results are summarized in Table 5.21.

Table 5.21: Effort Expectancy

	Number	Mean	Std. Dev-iation	Min-imum	Max-imum
Our interaction with the next level of e-commerce technology will be clear and understandable.	230	4.526	1.991	1	7
It would be easy for my staff and me to become skillful at using the next level of e-commerce technology.	230	4.600	2.040	1	7
My staff and I would find the next level of e-commerce technology easy to use.	230	4.604	2.040	1	7
Learning to operate the next level of e-commerce technology would be easy for my staff and me.	230	4.657	2.085	1	7
Sample size = 264. 25 firms were already at the highest level of adoption and did not answer this set of questions Scale: 1) Extremely unlikely, 2) Quite unlikely, 3) Slightly unlikely, 4) Neither likely nor unlikely, 5) Slightly likely, 6) Quite likely, 7) Extremely likely					

5.9.3 Social influence (Q13 – 16)

There seemed to be few role models for respondents when it came to technology enhancement. They seemed completely unaware, or unresponsive, to expectations of others to upgrade e-commerce levels in their firm. Respondents rated most questions as slightly unlikely to neither likely nor unlikely for the influence of others on e-commerce adoption. The expectation of support for enhanced e-commerce technology adoption was also low, with a rating of 4.062, indicating neither likely nor unlikely support. Results are summarized in Table 5.22.

Table 5.22: Social Influence

Sample size = 31	Number	Mean	Std. Dev-iation	Min-imum	Max-imum
People who influence me think that my staff and I should use the next level of e-commerce technology.	228	3.351	2.050	1	7
People who are important to me think that my staff and I should use the next level of e-commerce technology.	228	3.355	2.055	1	7
My staff and I would be supported by other senior managers of this business in the use of the next level of e-commerce technology.	227	4.000	2.222	1	7
In general, the organization will support the use of the next level of e-commerce technology.	227	4.062	2.231	1	7
Sample size = 264. 25 firms were already at the highest level of adoption and did not answer this set of questions Scale: 1) Extremely unlikely, 2) Quite unlikely, 3) Slightly unlikely, 4) Neither likely nor unlikely, 5) Slightly likely, 6) Quite likely, 7) Extremely likely					

5.9.4 CEO innovation (Q17 – 20)

The CEOs perceived themselves as being somewhat innovative, generally trying out new technologies and experimenting with them. Most respondents indicated that they were between neither likely nor unlikely (4) and slightly likely (5) to be innovative, given the items in the scale. The results are shown in Table 5.23.

Table 5.23: CEO Innovation

	Number	Mean	Std. Dev-iation	Min-imum	Max-imum
If I heard about a new technology I would find ways to experiment with it.	289	4.706	1.736	1	7
Among my peers, I am the first to try out new technologies.	289	4.436	1.984	1	7
In general, I am hesitant to try out new technologies.[1]	289	3.955	2.178	1	7
I like to experiment with new technologies.	289	4.813	2.007	1	7
[1]This item used a reverse scale: 7) Extremely unlikely, 6) Quite unlikely, 5) Slightly unlikely, 4) Neither likely nor unlikely, 3) Slightly likely, 2) Quite likely, 1) Extremely likely. Other items used the following scale: 1) Extremely unlikely, 2) Quite unlikely, 3) Slightly unlikely, 4) Neither likely nor unlikely, 5) Slightly likely, 6) Quite likely, 7) Extremely likely.					

5.9.5 CEO Knowledge (Q21 – 22)

CEO knowledge was measured using the same 7-point Likert scale, with descriptors of low or high as opposed to unlikely or likely. The results showed that respondents rated their knowledge as close to slightly high for both understanding and knowledge of e-commerce technologies. This does not represent a confident rating of knowledge, but clearly, respondents felt that they had enough knowledge about E-commerce technology to apply basic technologies. The results are summarized in Table 5.24.

Table 5.24: CEO's Knowledge

	Number	Mean	Std. Deviation	Minimum	Maximum
My understanding of e-commerce technology compared with my peers is…	289	4.910	1.495	1	7
I feel that my knowledge of e-commerce technology is…	289	4.726	1.507	1	7
Sample size = 289 Scale: 1) Extremely low, 2) Quite low, 3) Slightly low, 4) Neither high nor low, 5) Slightly high, 6) Quite high, 7) Extremely high.					

5.9.6 Employees' knowledge (Q23 – 25)

Respondents indicated that their employees had acceptable levels of computer knowledge, with most SMEs describing the computer literacy of their employees as computer literate (M = 3.799) and rating their employees use of computers as good compared to peers (M = 3.9002). Furthermore, most SMEs perceived that one employee could be considered a computer expert (M = 3.785). See Table 5.25 for a summary of the results.

Table 5.25: Employees' Knowledge

	Number	Mean	Std. Deviation	Minimum	Maximum
My employees are all computer literate.	288	3.799	1.230	1	5
There is at least one employee who is a computer expert.	288	3.785	1.400	1	5
I would rate my employees' understanding of computes as very good compared with other small companies in the same industry.	287	3.902	1.115	1	5
Sample size = 289 Scale: 1) Strongly disagree, 2) Disagree, 3) Neither agree nor disagree, 4) Agree, 5) Strongly agree					

5.10 Reliability of the items

As previously discussed, reliability addresses the degree to which measures are free from error and that they produce consistent and stable results (Zikmund 2003; Cooper & Schnidler 2001; O'Leary-Kelly & Vokurka 1998). As stated in the Research Methodology chapter, Cronbach's Alpha is the accepted test to measure reliability and it results in a coefficient ranging from 0-1, with reliability being higher as the coefficient approaches 1 (Green & Salkind 2003). While researchers do not agree on an acceptable coefficient cut-off, the generally accepted standards of Cronbach's Alpha scores of .60 for exploratory research, .70 as adequate for confirmatory purposes, and .80 for confirmatory purposes were adopted for this study (Garson 2005; Hair, Anderson, Tatham & Black 1998). The results from the Cronbach's Alpha tests revealed high Alpha scores for CEO Knowledge (.88), Performance Expectancy (.95), Effort Influence (.94), and Social Influence (.90). The results for CEO Innovativeness (.70) and Employee Knowledge (.65) would be viewed as acceptable and on the threshold of acceptability, respectively. The researcher decided to include both of them in the model for further testing See Table 5.26 for a summary of the reliability results.

Table 5.26: Descriptive Statistics and Reliability Analysis for Scaled Items

	Number	Mean	Std. Deviation	Minimum	Maximum	Cronbach's Alpha
CEO Innovativeness	289	17.910	5.772	4	28	.70
CEO Knowledge	288	9.632	2.838	2	14	.88
Employees' Knowledge	287	11.491	2.885	3	15	.65
Performance Expectancy	231	14.467	8.041	4	28	.95
Effort Expectancy	229	18.383	7.528	4	28	.94
Social Influence	227	14.762	7.539	4	28	.90
Sample size = 289 for CEO Innovativeness, CEO Knowledge and Employees' Knowledge scales. 25 firms were already at the highest level of adoption and did not answer questions related to the Performance Expectancy, Effort Expectancy or Social Influence Scales.						

5.11 Confirmatory factor analysis for scales

A factor analysis was conducted on the scales to see if they resulted in measures similar to those in the literature. Principal components analysis was chosen as it is an acceptable technique, using a varimax rotation, an orthogonal rotation method (Cooper & Schnider 2001); the technique is considered appropriate for studies that are based on a strong theoretical and/or empirical foundation (Stevens 1996). Furthermore, factor analysis is considered appropriate to reduce the number of variables in a study by examining the variability between the various items (Pallant 2001; Coakes & Steed 1999; Reyment & Joreskog 1993, Schmitt & Klimoski 1991; Bryman & Cramer 1990; Ferguson 1971). Business size was recoded to create a continuous variable by taking a midpoint of each category. Prior to conducting a factor analysis, the data had to be examined to ensure that it was an appropriate technique. In order to do this, the size of the sample was first considered, and two

standard tests, the Kolmogorov-Smirnov test (K-S test) and the Kaise-Meyer-Olkin (KMO), were run to determine if the data was suitable for factor analysis.

Researchers do not agree on an acceptable sample size for factor analysis. While some suggest that 100 subjects would be acceptable (Hatcher 1994), others insist that the minimum acceptable number of subjects should be higher. For example, Hutcheson and Sofroniou (1999) state that 150 subjects is the lowest acceptable level, Gorsuch (1983) states that the standard acceptable level should be 200, and Norušis (2005) sets the minimum number of subjects at 300. Since the number of subjects used in the factor analysis exceeds 200, thus meeting the minimum standards outlined by Hatcher (1994), Hutcheson and Sofroniou (1999), and Gorsuch (1983), the researcher considered the sample size to be acceptable.

The K-S test tests for normality, which is a normal distribution of the data. The K-S test for normality revealed that the sample departed slightly from normality for business size and all scales except for CEO Innovativeness. However, principal components extraction methods do not require an underlying assumption of multivariate normality, and the method was deemed to be suitable given that an assumption of normality is not required and that the sample only departed slightly.

The Kaiser-Meyer-Olkin (KMO) measures sampling adequacy, which predicts if the data is likely to factor well based on correlation and partial correlation (Garson 2007). The test results in a KMO statistic for each individual variable and their sum is used as the KMO statistic, which ranges from 0 to 1.0. The standard acceptability for KMO is .60, as this indicates that the sample is acceptable for factor analysis (Hair, Anderson, Tatham & Black 1998), although others have suggested a more relaxed cutoff (Hutcheson & Sofroniou 1999; Kaiser 1974). The KMO statistic was .66, indicating that the sample was indeed appropriate for factor analysis. These results indicated that no variables should be eliminated from the analysis, and as such, the factor analysis was used with all of the variables to test the model.

The analysis extracted three factors, explaining 67.2% of the cumulative variance in the model. The factor scales loaded heavily on the factors with no overlap or conflict. The results are summarized in Table 5.27.

Table 5.27: Rotated Component Matrix for Scaled Values and Business Size

		Factor 1	Factor 2	Factor 3
PERFEXP	Performance Expectations	**.897**	.045	.042
BBB EFFEXP	Effort Expectations	**.685**	.343	-.111
SOCINFL	Social Influence	**.899**	.021	.074
CEOINNOV	CEO Innovativeness	.143	**.624**	.173
CEOKNOW	CEO IT Knowledge	.073	**.809**	.097
EMPKNOW	Employee Knowledge	.055	**.594**	-.502
BUSSIZE	Business Size (Number of Employees)	.035	.219	**.847**
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 4 iterations.				

Based on the analysis, three factors were extracted:

Factor I: Expectations and Influence (Performance and Effort Expectations and Social Influence).

Factor II: Innovativeness and Knowledge (CEO Innovativeness, CEO and Employee Knowledge)

Factor III: Business Size (Number of Employees)

5.12 Model testing

In order to provide further understanding of the data, the following four issues will be examined:

1. The ability of the model to explain the variance (R^2_a) in SMEs e-commerce level of adoption.
2. The ability of the model to predict/classify users into groups of e-commerce users.
3. The ability of the model to explain the variance (R^2_a) in SMEs' intentions to adopt e-commerce or to adopt more sophisticated e-commerce technologies.

4. The ability of the model to predict SMEs' intentions to adopt e-commerce or to adopt more sophisticated e-commerce technologies.

Each issue is treated independently, using the methodologies discussed earlier in the Research Methodology chapter.

1) The ability of the model to explain the variance (R^2_a) in SMEs e-commerce level of adoption.

2) The ability of the model to predict/classify users into groups of e-commerce users.

As discussed in the Research Methodology chapter, a regression analysis was performed using the factor scores in the first series of tests on the data. Multiple regression is a frequently used research technique that can be used to establish whether a set of independent variables explains a proportion of the variance in a dependent variable at a significant level (through a significance test of R^2) and can establish the relative predictor importance of the dependent variables (Hair, Anderson, Tatham & Black 1998; Grimm & Yarnold. 1995). Prior to using multiple regression, the researcher looked at the sample size of his survey to determine if it was acceptable for the technique.

Researchers have not formed a consensus on an acceptable sample size for multiple regression, and there are a number of suggested limits. Stevens (2007) recommends that there should be 15 times the number of predictor variables, while Tabachnick and Fidell (2001) suggest the calculation N>=104+m, where m = the number of independent variables. Taking into account both suggested approaches for

calculating sample size, the sample used in this research would be considered acceptable.

A regression analysis using factor scores resulted in a significant explanation of the variance (R^2_a=.108, p=.000). However, only Factor 2, Innovativeness and Knowledge, was significantly related to the level of e-commerce adoption. The scales included on Factor 2 are CEO Innovativeness and CEO and Employee Knowledge. The resulting regression equation indicated that a one-unit increase in the factor score would have a .0967 increase in the level of technology adoption. The remaining factors did not have a significant impact on level of adoption of technology. The low R^2_a indicates that most of the variation in adoption level of e-commerce technology is not explained by the factor scores. Multicollinearity is not present between independent variables when factor scores are used because individual scale values load definitively on the different factors (Garson 2007).

Thus, this analysis was not affected by multicollinearity directly. In addition, a collinearity diagnostic was produced to ensure that multicollinearity did not impact the factor solution that was then regressed against e-commerce adoption level. A collinearity diagnostic is an accepted method for examining multicollinearity in regression analysis. The test calculates condition indices. When the condition indices exceed 15.0 there may be some multicollinearity problems, and when the indices reach 30.0 then the sample is not considered acceptable for multiple regression (Garson 2007). The condition indices from collinearity diagnostics were equal to 1.0, indicating that multicollinearity did not impact the regression analysis from the factor scores.

Table 5.28: Regression Analysis of Factor Scores on e-commerce Adoption Level

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	0.347	0.121	.108	0.96
Predictors: (Constant), Factor 1, Factor 2 and Factor 3				

Analysis of Variance on Regression Model					
Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Regression	26.971	3	8.990	9.828	***.000***
Residual	196.382	215	.915		
Total	223.653	218			
Predictors: (Constant), Factor 1, Factor 2 and Factor 3					
Dependent Variable: Adoption Level					

Regression Coefficients					
	Unstandardized Coefficients		**Standardized Coefficients**	**T**	**Sig.**
Model	B	Std. Error	Beta		
(Constant)	2.763	.065		42.742	***.000***
Factor 1	.0967	.065	.094	1.476	.141
Factor 2	.320	.065	.316	4.948	***.000***
Factor 3	.112	.065	.110	1.723	.086
Dependent Variable: Adoption Level					

The relationship was also tested using discriminant analysis to see if there was a way to predict levels of e-commerce adoption given factor scores for each firm. Discriminant analysis is considered to be appropriate when the researcher wants to assign individuals to groups (Wulder 2007; Whitaker 1997). Determining appropriate sample size for discriminant analysis is based upon the number of predictor variables, with Poulsen and French (2007) noting that the smallest sample size acceptable would be 20 based on four or five predictors. Thus, the sample size for this research would be acceptable.

As a multivariate technique, discriminant analysis requires that the variance be equal for each dependent variable across the groups created by the independent variable. A covariance matrix is produced that captures the variance of each dependent variable across experimental groups, as defined by the research model (Grimm & Yarnold 1995). The Box's M statistic is then used to determine whether or not the differences between covariance matrices are statistically significant. Generally, if the differences are statistically significant, the covariance matrices are not equal and discriminant analysis cannot be used with the dataset (Hair, Anderson, Tatham & Black 1998). However, Box's M is not a robust test and is easily impacted by slight deviations from normal distributions in the sample variables. It has also been shown that discriminant analysis can be reliable even when there are slight differences between variances, provided there are no severe outliers in the data. Therefore, reviewing the log determinants when interpreting Box's M is important, especially when sample sizes are large. If the differences between log determinants are not large, the discriminant analysis may still be reliable (Garson 2007).

The Kappa coefficient is used to determine whether or not discriminant analysis accurately predicted group membership (Green & Salkind 2003). K equal to 1.0 is perfect prediction, while a coefficient of zero would measure complete lack of correct prediction. A Kappa coefficient of less than zero indicates less than chance prediction. The coefficient is computed by the following equation:

$K = P(A) – P(E)/1 – P(E)$, where $P(A)$ = number of correct classifications in model and $P(E)$ = number of correct classifications due to chance (Di Eugenio, 2000).

Wilks' Lambda describes the amount of variation in the dependent variable that is not explained by the independent variables in the model. In discriminant analysis, Wilks' Lambda is used to examine how well the model discriminates between groups. A statistically significant Wilks' Lambda indicates that the discriminant function significantly discriminates between groups (Grimm & Yarnold. 1995).

The resulting discriminant analysis confirmed what the regression analysis indicated, that there is a significant relationship between the factor scores and level of e-commerce adoption. However, the ability to correctly predict high level adopters was low, showing that the analysis itself was not useful. Box's M showed that there were statistically significant differences in covariance matrices, violating the assumption of equality of covariance matrices (Box's $M = 52.791$, $p = .000$). However the log determinants show only minor differences, which may mean that the test results are still reliable. The overall Wilks' Lambda, which is used to test the significance of the discriminant function as a whole, was significant, so the first function is interpreted (Grimm & Yarnold. 1995). The residual Wilks' Lambda was not significant ($p > .05$). Therefore the second function is not interpreted. The

square of the canonical correlation for Function 1 is .07, indicating that 7% of the variation in level of adoption is explained by Function 1. However, the Kappa score is inconclusive because the discriminant function did not predict any high level adopters. Therefore, the test is inconclusive, and it cannot be determined if the factor scores make a statistically significant difference in the classification of cases by adoption level. The results also show that classification is hardly better than chance, resulting in correct classification of only 53.9% of original cases and correct classification of 53.0% of cross-classified cases. The results are summarized in Table 5.29.

Table 5.29: Discriminant Analysis of Factor Scores on Level of e-commerce Adoption

Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	.074	75.3	75.3	.262
2	.024	24.7	100.0	.154

First two canonical discriminant functions were used in the analysis.

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1 through 2	.909	20.413	6	***.002***
2	.976	5.135	2	.077

Standardized Canonical Discriminant Function Coefficients

	Function	
	1	2
Factor 1	-.030	.946
Factor 2	.874	.186
Factor 3	.520	-.273

Structure Matrix

	Function	
	1	2
Factor 1	.854	.191
Factor 2	.486	-.268
Factor 3	-.028	.942

A final regression analysis on e-commerce adoption level was conducted using only the scales and business size, without conducting a previous factor analysis. Some evidence of multicollinearity was present in the analysis. Condition indices of more than 15.0 indicate that there is some likelihood of multicollinearity. However, none of the condition indices approached 30.0, which would indicate that the dataset was not suitable for regression analysis.

The resulting analysis was statistically significant, indicating that there are statistically significant relationships between some of the scale factors, as well as business size and adoption level for e-commerce technology. The analysis was strong, showing relationships between Employee Knowledge, Effort Expectations, and Business Size. However, the variance explained (R^2_a =.172) would be considered low, indicating that much of the variation in adoption level for e-

commerce technology cannot be explained by the variables studied. The results are summarized in Table 5.30.

Table 5.30: Regression Analysis of Scales on Level of Adoption e-commerce

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.445	.198	.172	.92
Predictors: (Constant), SOCINFL, CEOKNOW, BUSSIZE, CEOINNOV, EFFEXP, PERFEXP				

Analysis of Variance on Regression Model					
Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Regression	44.324	7	6.332	7.450	***.000***
Residual	179.329	211	.850		
Total	223.653	218			

Regression Coefficients					
Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
	B	Std. Error	Beta		
(Constant)	1.161	.325		3.569	***.000***
CEO Innovativeness	.004	.012	.027	.397	.692
CEO Knowledge	.022	.024	.064	.911	.363
Employee Knowledge	.075	.022	.221	3.409	***.001***
Performance Expectations	.011	.012	.084	.904	.367
Effort Expectations	.023	.010	.167	2.184	***.030***
Social Influence	-.019	.012	-.139	-1.507	.133
Business Size (number of employees)	.010	.002	.279	4.469	***.000***
Dependent Variable: Adoption Level					

The relationship was also tested using discriminant analysis to see if there was a way to predict level of e-commerce adoption given scale scores for each firm. The results confirmed what the regression analysis indicated, that there is a significant relationship between some scales and level of e-commerce adoption. However, the results may be more exploratory than conclusive, due to differences in the covariance matrices (Box's M = 168.579, p = .000).

The overall Wilks' Lambda was significant, so the first function is interpreted. The residual Wilks' Lambda was not significant ($p > .05$); therefore, so the second function is not interpreted.

The square of the canonical correlation for Function 1 is .14, indicating that 14% of the variation in level of adoption is explained by Function 1.

The Kappa score indicated that the discriminant function made a statistically significant difference in the classification of cases by adoption level, resulting in correct classification for 65.3% of original cases and correct classification of 60.3% of cross-classified cases (Kappa=.338, p=.000). The results are summarized in Table 5.31.

Table 5.31: Discriminant Analysis of Scales and Business Size and Level of e-commerce Adoption

Eigenvalues

Function	Eigen-value	% of Variance	Cumulative %	Canonical Correlation
1	.159	79.2	79.2	.370
2	.042	20.8	100.0	.200

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	.828	40.103	14	***.000***
2	.960	8.705	6	.191

Standardized Canonical Discriminant Function Coefficients

Adoption Level of e-commerce	Function 1	Function 2
CEO Innovativeness	.082	.101
CEO Knowledge	.054	-.215
Employee Knowledge	.385	.500
Performance Expectations	.109	-.221
Effort Expectations	.482	-.016
Social Influence	-.588	1.012
Business Size (number of employees_	.758	.009

Structure Matrix

Adoption Level of e-commerce	Function 1	Function 2
CEO Innovativeness	.698	.046
CEO Knowledge	.317	.035
Employee Knowledge	-.159	.856
Performance Expectations	.019	.534
Effort Expectations	.434	.489
Social Influence	.370	.421
Business Size (number of employees)	.162	.210

Canonical Discriminant Function Coefficients		
Adoption Level of e-commerce	**Function**	
	1	**2**
CEO Innovativeness	.014	.017
CEO Knowledge	.018	-.072
Employee Knowledge	.132	.171
Performance Expectations	.014	-.028
Effort Expectations	.065	-.002
Social Influence	-.079	.136
Business Size (number of employees)	.028	.000
Constant	-2.600	-3.138
Functions at Group Centroids		
Adoption Level of e-commerce	**Function**	
	1	**2**
Low level of adoption	-.439	.056
Medium level of adoption	.297	-.124
High level of adoption	.743	.796

3) The ability of the model to explain the variance (R^2_a) in SMEs' intentions to adopt e-commerce or to adopt more sophisticated e-commerce technologies.

4) The ability of the model to predict SMEs' intentions to adopt e-commerce or to adopt more sophisticated e-commerce technologies.

A regression analysis was conducted to determine the impact of business size and scale values on the respondents' behavioural intension to adopt the next level of e-commerce. The results were statistically significant, revealing that the first factor (Expectations and Influence) had a statistically significant impact on the intensity of the firm's intention to enhance its e-commerce technology. The resulting equation showed that a one-unit increase in the factor score would have a 3.619-unit increase in the behavioural intensity (degree of intention) to adopt IT. The R^2_a value indicated that 35.5% of the variance in the Behavioural Intention scale was explained by the factor scores. The results are summarized in Table 5.32.

Table 5.32: Regression Analysis of Factor Scores on Behavioural Intention to Adopt Next Level of e-commerce

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	0.603	0.364	0.355	4.834
[1] Predictors: (Constant), Factor 1, Factor 2 and Factor 3				

Analysis of Variance on Regression Model					
Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Regression	2912.605	3	970.868	41.545	***.000***
Residual	5094.445	218	23.369		
Total	8007.050	221			

Regression Coefficients					
Model	**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
	B	**Std. Error**	**Beta**		
(Constant)	6.790	.324		20.929	*.000*
Factor 1	3.619	.324	.603	11.153	***.000***
Factor 2	.0142	.324	.002	.044	.965
Factor 3	-.162	.324	-.027	-.199	.618

The relationship was also tested using discriminant analysis. The results are conclusive even though there are differences in covariance matrices (Box's M = 52.791, p = .000).

The log determinants show only minor differences, which means that the test results are probably still reliable (Garson 2007).

The overall Wilks' Lambda was significant, so the first function was interpreted. The residual Wilks' Lambda was not significant (p > .05); therefore, the second function was not interpreted. The square of the canonical correlation for Function 1 is .404, indicating that 40% of the variation in level of adoption is explained by Function 1.

The Kappa score indicates that the discriminant function does make a statistically significant difference in the classification of cases by adoption level (Kappa = .396, p = .000). Correct classification was found for 68.5% of original cases and for 67.1% of cross-classified cases. A summary of the results appears in Table 5.33.

Table 5.33: Discriminant Analysis of Factor Scores on Behavioural Intention to Adopt Next Level of e-commerce

Eigenvalues				
Function	**Eigenvalue**	**% of Variance**	**Cumulative %**	**Canonical Correlation**
1	.678	99.2	99.2	.636
2	.006	0.8	100.0	.074
First two canonical discriminant functions were used in the analysis.				

Wilks' Lambda				
Test of Function(s)	**Wilks' Lambda**	**Chi-square**	**df**	**Sig.**
1 through 2	.593	114.052	6	***.000***
2	.995	1.199	2	.549

Standardized Canonical Discriminant Function Coefficients		
	Function	
	1	**2**
Factor 1	.999	-.017
Factor 2	.075	.729
Factor 3	-.038	.686

Structure Matrix		
	Function	
	1	**2**
Factor 1	.996	-.029
Factor 2	.045	.728
Factor 3	-.023	.684

A basic analysis using only regression, without preliminary factor analysis, revealed that there were significant relationships between performance expectation, effort expectation, social influence, and behavioural intensity to adopt the next level of e-commerce technology. However, some evidence of multicollinearity was present in the analysis. Condition indices of more than 15.0 indicate that there is some likelihood of multicollinearity. However, none of the condition indices approached 30.0, indicating that the dataset was still suitable for regression analysis (Garson 2005).

The R^2_a indicates that the scale variables explained 38.4% of the variance in behavioural intention to adopt e-commerce (See Table 5.34). The resulting regression equation follows:

Behavioural Intensity to Adopt e-commerce = -.938 + .206 (PERFORMANCE EXPECTATION) + .316 (SOCIAL INFLUENCE).

Table 5.34: Regression Analysis on Scales and Business Size and Behavioural Intention to Adopt e-commerce

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.635	.403	.3840	4.723

Analysis of Variance on Regression Model					
Model	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Regression	3228.456	7	461.208	20.654	***.000***
Residual	4778.593	214	22.330		
Total	8007.050	221			

Regression Coefficients					
Model	**Unstandardized Coefficients**		**Standard-ized Coefficients**	**t**	**Sig.**
	B	**Std. Error**	**Beta**		
(Constant)	-.938	1.657		-.566	.572
CEO Innovativeness	.0846	.060	.081	1.415	.158
CEO Knowledge	-.130	.121	-.065	-1.081	.281
Employee Knowledge	.018	.113	.009	.163	.871
Performance Expectations	.206	.060	.274	3.415	***.001***
Effort Expectations	-.007	.052	-.009	-1.36	.892
Social Influence	.316	.063	.397	5.030	***.000***
Business Size (number of employees)	-.018	.011	-.085	-1.594	.112

Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	.822[a]	98.4	98.4	.672
2	.013[a]	1.6	100.0	.114

a. First 2 canonical discriminant functions were used in the analysis.

These relationships were further examined by using discriminant analysis to see if the scale values could predict whether or not firms had high, medium or low behavioural intensities to adopt the next level of e-commerce technology. The

results were exploratory rather than conclusive, due to differences in covariance matrices: (Box's M = 108.191, p = .000). The log determinants showed only minor differences, meaning that the test results are probably still reliable (Garson 2007).

The overall Wilks' Lambda was significant, so the first function was interpreted. The residual Wilks' Lambda was not significant (p > .05); therefore, so the second function was not interpreted. The square of the canonical correlation for Function 1 is .45, indicating that 45% of the variation in level of adoption is explained by Function 1.

The Kappa score indicates that the discriminant function does make a statistically significant difference in the classification of cases by adoption level (Kappa = .381, p = .000). The model correctly classified 67.1% of original cases and 65.3% of the cross-classified cases. See Table 5.35 for the analysis.

Table 5.35: Discriminant Anlsysis on Scales and Business Intention to Adopt e-commerce

Wilks' Lambda				
Test of Functions	**Wilks' Lambda**	**Chi-square**	**Df**	**Sig.**
1 through 2	.542	132.437	14	.000
2	.987	2.820	6	.831
Structure Matrix				
			Function	
			1	**2**
Performance Expectations			.861*	.317
Social Influence			.850*	-.250
Effort Expectations			.379*	-.173
Number of Employees (Ungrouped estimate)			-.034	.580*
CEO Innovativeness			.245	.351*
CEO Knowledge			.068	.321*
Employee Knowledge			.066	.249*
Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions. Variables ordered by absolute size of correlation within function				
*Largest absolute correlation between each variable and any discriminant function.				

Table 5.35: Discriminant Anlsysis on Scales and Business Intention to Adopt e-commerce (cont)

Standardized Canonical Discriminant Function Coefficients		
	Function	
	1	2
CEO Innovativeness	.209	.209
CEO Knowledge	-.084	.236
Employee Knowledge	.023	.253
Performance Expectations	.561	.719
Effort Expectations	-.037	-.423
Social Influence	.563	-.616
Number of Employees (Ungrouped estimate)	-.165	.574

Symmetric Measures				
	Value	Asymp. Std.Error	Approx. T	Approx. Sig.
Measure of Agreement Kappa	.381	.048	7.659	.000
N of Valid Cases	222			

a. Not assuming the null hypothesis
b. Using the asymptotic error assuming the null hypothesis.

Classification Results

		Re-grouped Beh-avioural Intention	Predicted Group Membership			Total
			1.00	2.00	3.00	
Original	Count	1.00	117	6	10	133
		2.00	18	2	20	40
		3.00	12	7	30	49
		Ungrouped cases	1	0	0	1
	%	1.00	88.0	4.5	7.5	100.0
		2.00	45.0	5.0	50.0	100.0
		3.00	24.5	14.3	61.2	100.0
		Ungrouped cases	100.0	.0	.0	100.0
Cross-validated	Count	1.00	113	9	11	133
		2.00	18	2	20	40
		3.00	12	7	30	49
	%	1.00	85.0	6.8	8.3	100.0
		2.00	45.0	5.0	50.0	100.0
		3.00	24.5	14.3	61.2	100.0

a. Cross-validation is done only for those cases in the analysis. In cross-validation, each case is classified by the functions derived from all cases other than that case.
b. 67.1% of original grouped cases correctly classified.
c. 65.3% of cross-validated grouped cases correctly classified.

Table 5.35: Discriminant Anlsysis on Scales and Business Intention to Adopt e-commerce (continued)

Crosstab						
			Predicted Group for Analysis 1			Total
			1.00	2.00	3.00	
Regrouped Behavioural Intention IT – Low/Med/ High	1.00	Count	117	6	10	133
		Expected Count	88.1	9.0	35.9	133.0
		% within Regrouped Behavioural Intention IT – Low/Med/High	88.0%	4.5%	7.5%	100.0%
	2.00	Count	18	2	20	40
		Expected Count	26.5	2.7	10.8	40.0
		% within Regrouped Behavioural Intention IT – Low/Med/High	45.0%	5.0%	50.0%	100.0%
	3.00	Count	12	7	30	49
		Expected Count	32.4	3.3	13.2	49.0%
		% within Regrouped Behavioural Intention IT – Low/Med/High	24.5%	14.3%	61.2%	100.0%
Total		Count	147	15	60	222
		Expected Count	147.0	15.0	60.0	222.0
		% within Regrouped Behavioural Intention IT – Low/Med/High	66.2%	6.8%	27.0%	100.0%

5.13 Summary

This chapter reported on the analysis of the survey data resulting in a description of the use of e-commerce by SMEs in Atlantic Canada and insight into what factors facilitate this use. The chapter started with a descriptive analysis of demographic data, followed by an examination of SMEs' use of e-commerce and concluded with a series of statistical tests on the model posited in Chapter 2. The use of e-commerce by Atlantic Canadian SMEs can be described as limited and while current use cannot be explained well by the model developed for this research the model does provide insight into SMEs intentions to adopt e-commerce and the sophistication of the adoption. Chapter 6 provides further discussion about the implications of the findings.

CHAPTER 6: DISCUSSION AND CONCLUSION

6.1 Introduction

This chapter discusses and integrates the research findings from the survey that was summarized and reported in Chapter 5. As previously outlined in Chapter 1 the focus of this research is:

- To provide an understanding of the nature and current state of e-commerce use among SMEs in Atlantic Canada
- To gain insight into the perceptions SMEs have about the technology
- To explain the variance in SMEs' current usage of e-commerce
- To understand the variance in SMEs' intentions to adopt or further their adoption of e-commerce

While the research focus addresses several areas of concern, the main question or problem relates to SMEs' intentions to adopt or further adopt e-commerce. This was selected due to the importance of SMEs to the Atlantic Canadian economy and the proven benefits SMEs can gain from e-commerce adoption. The overall research question reads as:

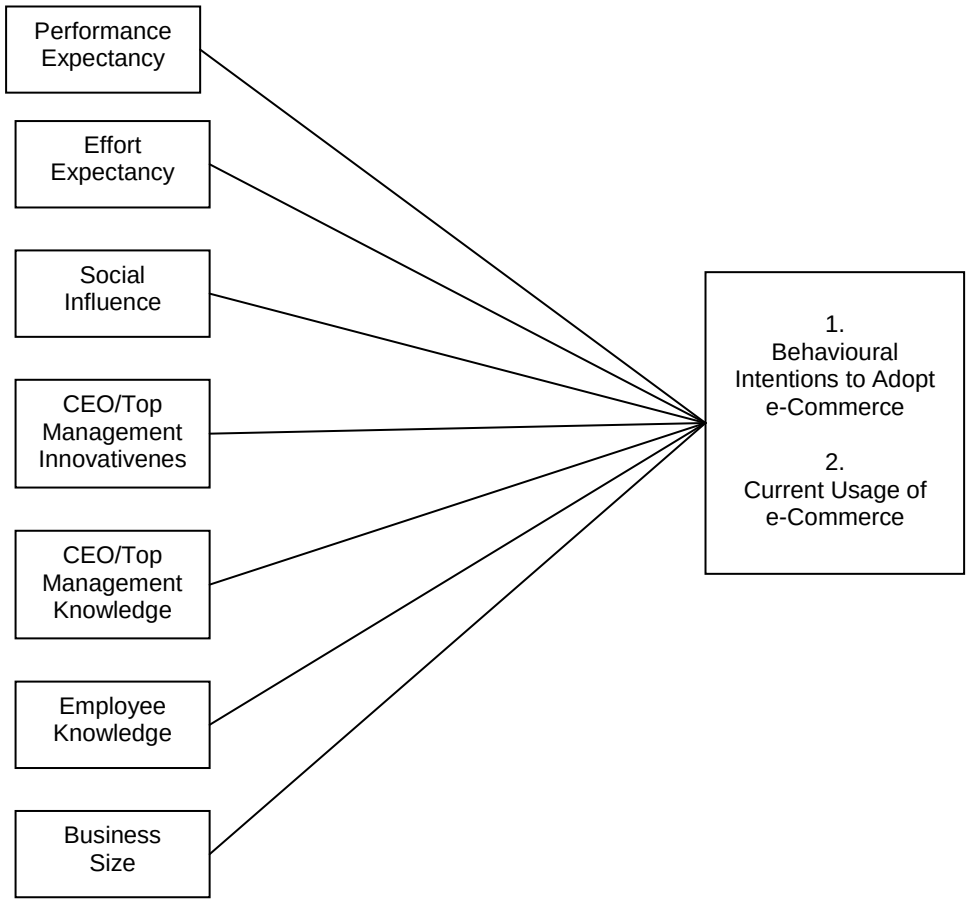
> *What is the nature and extent of e-commerce adoption in Atlantic Canadian SMEs and does the proposed model in this research explain the variance in SMEs intentions to adopt or further adopt e-commerce?*

Chapter 2 opened with a concise review of the literature on innovation adoption and behavioral intention research. The chapter then narrowed in scope and reviewed literature pertaining to the adoption of IT in SMEs and the adoption and use of e-commerce by SMEs, including Canadian and Atlantic Canadian SMEs. In addition, the unique characteristics of SMEs were discussed and the research context of Atlantic Canada was explored. From the comprehensive review, a preliminary model was constructed to explain the variance in SMEs' use and intentions to use or further their use of e-commerce.

In Chapter 3 the research methodology was discussed. The chapter first addressed the use of two comprehensive pilot studies, including a case study with five SMEs and a pre-test with 31 firms. The chapter then examined the use of a full random survey that was administrated via the phone to 289 SMEs.

An analysis of the pilot studies is reported in Chapter 4, including summaries of the interviews and a cross-case analysis. The results from the case studies were used to modify the questionnaire and to confirm aspects of the preliminary model. The pre-test was then reviewed including it impact on finalizing the questionnaire and the proposed model. The chapter then presented a final model (See Figure 4.1 repeated below as Figure 6.1) to explain the variance in SMEs' current use and intentions to adopt e-commerce.

Figure 6.1: Preliminary Model (Note that this is Figure 4.1 repeated for the convenience of the reader)



Chapter 5 presented the findings from the survey data, including tables that summarize the demographic information and nature and extent of e-commerce used. The chapter then reported the results of the statistical tests. The statistical tests included a confirmatory factor analysis which extracted three factors from the model: Factor I: Expectations and Influence (Perfomance and Effort Expectations and Social Influence); Factor II: Innovatievness and Knowledge (CEO Innovatievness, CEO and Employee Knowledge) and Factor III: Business Size, which explained 67.2% of the cumulative variance in the model. The regression analysis revealed that the model resulted in a significant explanation of the variance (R^2_a=.108, p=.000) but the low low R^2_a indicates that most of the variation in adoption level of e-commerce technology is not explained by the factor scores. Regression tests did reveal that model did explain 35.5% (R^2_a=.355, p=.000) of SMEs behavioral intentions to adopt more sophisticated technology.

This chapter will first discuss the conclusions for research in Section 6.2, including theoretical implications, followed by Section 6.3 which examines implications for policies and practice. Section 6.4 will examine limitations of the research, and the chapter will conclude with an identification of areas for further research in Section 6.5, followed by a summary in Section 6.6.

6.2 Conclusions for the Research Question

As mentioned above, the research had four main foci that will serve as a guide for the presentation of the conclusions. All of these questions draw on the results from the random sample phone survey, although some supplementary information from the case studies will be presented. The response rate for the survey was 17% and is considered acceptable for research with CEOs/top management, and is similar to Thong (1999) as well as Daniel and Grimshaw (2002). This section will summarize the findings, then make conclusions and discuss the results within the context of previous research.

6.2.1 Nature and extent of e-commerce use in Atlantic Canadian SMEs

Respondents were asked a number of questions about their use and extent of use of e-commerce technologies. The results are summarized under headers that are specific to the question. The findings from the empirical analysis provide a useful contribution to the understanding of the nature and extent of e-commerce use as:

- The survey studies the use of e-commerce in Atlantic Canadian SMEs --something that government studies have failed to completely do (see Chapter 2).

- The findings do not just report on the use of a technology, but also the frequency of use. This provides further insight into acceptance of e-commerce in the region. Studies in Canada have not studied the frequency of e-commerce technology use.

Email

Survey results revealed that email is becoming increasingly common and important to SMEs as a communication device. Eighty eight percent of SMEs regularly (M = 5.732; Based on a mean score using 1 – 7 to indicate frequency of use) use email with customers, and 78.2% use email on a frequent basis with suppliers. Internal email is used by only 65% of respondents but it is the most frequent (M = 6.226) form of communication. The smaller percentage of internal email use is most likely a result of the small size of the respondents' firms as 47.1% reported less than five employees. With so few employees, more traditional communication such as conversations and informal meetings may occur.

The results confirm previous research that email is becoming one of the main sources of communications used by SMEs (Johnston, McClean & Wade 2004). Noce and Peters (2005), in a study of Canadian SME email use, found that 78% of firms use email. Research conducted by the Canadian government reports slightly less use of email, but the studies are from 2000 – 2004 and some growth in acceptance is to be expected (Johnston, McClean & Wade 2004; CeBI 2003). Fomin et al. (2005) found a higher rate of email use in American SMEs (99.5%), but the country's businesses have been quicker to adopt E-commerce technologies compared with Canadian SMEs (Fast Forward 5.0 2004).

In addition to providing evidence about the use of email by SMEs, the survey also provides information that highlights the strong frequency of use. Email is frequently

used to communicate with external parties and within companies. The literature review did not find any Canadian studies that discussed the frequency of use of e-commerce technologies.

Web Browsing

SMEs are engaging in web browsing to search for information on suppliers (75.9%) and, to a lesser extent, to learn about competitors (55.2%) and customers (54.7%). The frequency of use follows a similar pattern as SMEs are more likely to look for information on suppliers (M = 5.204), compared to competitors (M = 5.089) and customers (M = 4.636).

The survey results shed some insight into the use of web browsing by Canadian SMEs as the literature review did not specifically report on this activity. Studies completed by the Canadian government placed web browsing in the same category as email use and labeled the category as Internal Operation. Canadian research reported that 64% of firms engaged in these activities (Johnston, McClean & Wade 2004). It would appear that the use of web browsing has remained static, but with the lack of a direct comparison, it is difficult to accurately make that judgment. Research from other countries reports similar results as both Fomin et al. (2005) and Martin & Matlay (2003) indicated that the use of browsing by SMEs has not increased in recent years.

Making Purchases

Analysis of the empirical evidence indicates that SMEs are using the Internet to partially complete purchases from suppliers online. Approximately 71% of firms noted that they make purchases based on information that they have sourced online while they complete the transaction using either Internet, email, or the telephone. A smaller number of firms complete transactions completely online (53.8%) and a small percentage are engaged in EDI (45.8%).

While Atlantic Canadian SMEs are engaging in some type of online or web-assisted procurement, they are not doing so at a high frequency. Firms describe their use of online procurement as neither frequent nor infrequent. Complete online purchasing is the least frequent activity as M = 4.195, and EDI is the most frequent at M = 4.954. These findings assist in understanding the nature and extent of online purchases as evidence from Canadian studies does not differentiate between the two.

The lack of frequency in SMEs completing transactions completely online may be a result of the lack of suppliers who make this option available. Survey results (discussed later in this chapter) reveal that 22.4% of Atlantic Canada SMEs sell goods completely online. This supports other research in both the United States (Mohan-Neill 2006) and Canada (Noce & Peters 2005). The higher use of EDI is most likely the result of pressure exerted by other members in the value chain (Iacovou, Benbasat & Dexter 1995).

The results from the survey indicate that there has been growth in Canadian SMEs' use of online purchases. Results from the Canadian Fast Forward studies and the Net Impact research indicated that 29% to 51.3 % engaged in some form of online purchasing. Since none of the Canadian studies discussed the frequency of use of

online purchasing, the empirical evidence provides insight into how often firms engage in these activities.

Fomin et al. (2005) found a higher percentage of American firms (73.5%) used online purchasing but noted that the use represented only a small portion of their total purchases.

Online Sales

Survey results revealed that 44.1% of firms advertise goods and/or services for sale via the Internet and allow customers to phone or email orders. The number of firms that allow customers to complete full transactions online is almost half at 22.4%, while 17.8% sell goods via online auctions. The frequency of use follows a similar pattern as firms are most likely to offer goods for sale online with the customer emailing or phoning in the order (M = 4.837) followed by the completion of full online transactions (M = 4.453) and finally online auctions (M = 3.769).

The empirical evidence is contradictory to some of the Canadian research in the literature review. As previously discussed in Chapter 2, the majority of the Canadian Studies, including research published by Statistics Canada, precludes firms with revenue less than $250,000 and/or less than 20 employees. Thus their research is on larger, more successful (revenue) SMEs which often make greater use of e-commerce technologies (Fast Forward 5.0 2004). Furthermore their definition of online sales is an expanded one that includes any type of online ordering assistance including using the telephone, fax machine or email to place an order. For example, an order that was placed based on a published brochure that was emailed in would be considered an online sale based on their extended definition. As the majority of respondents in this sample (82.8%) had less than 20 employees and $250,000 in revenue (42% of SMEs that answered the question) a lower percentage of firms engaging in online sales was to be expected. Canadian research found that 50 – 60% of firms were engaging in online sales (Net Impact VI 2006; Fast Forward 4.0 2004; Johnston, McClean & Wade 2004) and this number is higher than the survey results that indicates 44.1% of Atlantic Canadian SMEs were engaged in online sales.

The results confirmed research in the literature review that used a less liberal definition of online sales, and used a sample of companies with similar demographic characteristics as used in the research. Mohan-Neill (2006) found 11.7% of firms engaging in online sales, while Fomin et al. (2005) reported the number roughly at 14 - 16.5%.

As indicated above, online selling is not a very frequent activity for firms. This confirms Canadian and International research which illustrates that online sales represents a small portion of SME revenue.

Website Use

The survey results noted that 63.6% of SMEs have a public website. Based on the analysis of information from the case studies and the statistical evidence from the survey, it can be determined that most websites are for external marketing purposes. The results indicate that website use among Canadian SMEs is growing as past research indicates that website use among Canadian SMEs ranged from 27% to 34% (Noce & Peters 2005; Johnston, McClean & Wade 2004). The percentage in the survey is also high compared to some results in the United States where Mohan-Neill (2006) found that 38.3% of firms had a website. Various other researchers noted website use in the 30% - 40% range including Saythe and Beal (2001), Buhalis and Deimez (2003), and MacGregor and Vrazalic (2004). Other researchers found a higher percentage of firms had a website (Fomin et al. 2005; Grandon & Pearson 2004a, 2004b). The difference in research may be a result of geographical locations or based on the period in time when the research occurred.

While the research on website use by SMEs is contradictory, the findings in the survey provide meaningful evidence that Atlantic Canadian SMEs have been quicker than SMEs in other regions of the country to adopt the technology. The results are even more surprising given the small size of the companies in the study and their low levels of revenue.

Website Features and Functions

Empirical evidence from the survey revealed that websites used by SMEs contained a great deal of information about their business but most did not allow for the completion of full transactions and/or offer visitors multimedia activities. Table 5.18 has been reproduced from Chapter 5 to provide a summary of the survey response results.

Table 6.1: Website Features

	Number	Percent
Contact information for the company	180	98.4%
Information about product, including pictures and descriptions	174	95.1%
Allow visitors to email company directly from the website	173	94.5%
Allow customers to use the telephone or an email address to place an order from the website	118	64.5%
Answers to frequently asked questions (FAQ)	114	62.3%
Make recommendations for customer purchases	67	36.6%
Allow customers to post reviews of company products	56	30.8%
Track customers' current and past purchases	47	25.7%
Use multi-media, such as web videos, product demonstrations, etc.	45	24.7%
Provide a bulletin board to post comments on products, the company, etc.	38	20.8%
Allow customers to purchase products directly from the website using a credit card or EDI	35	19.3%
Calculate shipping costs for a product	27	14.8%
Track shipping time of a product	27	14.8%
Have online chat	8	2.8%
Sample size = 289 responded to question about website. Only the firms with a website responded to subsequent questions about website features (n=183).		

The survey is the first to report on the features and functions of websites among Atlantic Canadian SMEs. In addition none of the research produced by the Canadian government directly discusses or identifies the features and functions of Canadian SMEs' websites. Thus the research is significant as it establishes a benchmark from which future results can be compared in the region.

Level of e-commerce currently used

Respondents were also asked to classify their current use of e-commerce into one of six categories with category I representing firms at the low end of e-commerce adoption and category VI at the high end. The empirical evidence determined that many SMEs have adopted basic technologies as 59.5% of firms rated their use as either category II or III but that the majority of SMEs have not adopted sophisticated technologies (13.8% were in category V or VI).

These results confirm the Canadian research noted in the literature review. As noted in Fast Forward 5.0 (2004), Net Impact IV (2004) and by Noce and Peters (2005), Canadian SMEs' adoption of the Internet has stalled at basic technologies. Similar results have been reported from various geographic regions such as Australia (MacGregor & Vrazalic 2004), the United States (Fomin et al. 2005; Cisco 2005) and Chile (Grandon & Pearson 2004).

Intention to adopt or further adoption of technology

SMEs in the survey are not planning to adopt or further their adoption of e-commerce technologies in the coming six months. Respondents overall use of e-commerce technologies is low as noted above and they have no plans on enhancing its use. This confirms both Canadian and International research in the literature review that SMEs do not use sophisticated nor do they plan to adopt such technologies (Johnston, McClean & Wade 2004; Riemenschneider, Harrison & Mykytyn 2003; Mirchan-dani & Motwani 2001).

The classification of SMEs into the stages/categories developed for this research provides support for the classification stages/categories used in this research. Furthermore it provides theoretical support for the assertion that SMEs adopt e-commerce technologies in stages (Johnston, McClean & Wade 2004; Daniel, Wilson & Myers 2002; Rao, Metts & Monge 2003). Of the firms surveyed not one firm had indicated that they had adopted or used a sophisticated technology without first adopting all of the technologies in the previous stages. This contradicts some research (MacGregor & Vrazalic 2004; MacGregor et al. 2003; Tetteh & Burn 2001) that found support for firms adopting e-commerce more quickly without progressive movement from one stage to another.

6.2.2 Summary of Nature and extent of e-commerce use in Atlantic Canadian SMEs

The empirical analysis of the survey's results in a consensus, that Atlantic Canadian SMEs are adopting basic Internet technologies but are not adopting or planning to adopt sophisticated technologies. While evidence exists that SMEs that adopt e-commerce are likely to experience significant benefits (Net Impact Canada 2006) it is evident that decision makers do not understand the benefits of initially adopting the technology or furthering the extent of their adoption. The next section discusses the perceptions of decision makers towards the adoption of e-commerce in order to gain insight into why SMEs appear to be only adopting basic technologies.

6.2.3 Perceptions of Decision Makers towards the Adoption of E-commerce

Respondents were asked a number of questions that pertain to the model being tested in this dissertation. In addition to aiding in the testing of the model the questions also provide insight into the decision makers' (CEO/Top Management) perceptions of adopting e-commerce or furthering their adoption of e-commerce. These perceptions are discussed in this section prior top discussing the results from the model.

Performance Expectancy

Results reveal that most decision makers are unconvinced that adopting or furthering the adoption of the e-commerce would benefit their business. Respondents were asked a series of questions about the ability of e-commerce to aid their firm in improving their business, efficiencies, productivity and profitability, and results reveal that most felt that the adoption of e-commerce was slightly unlikely to neither likely nor unlikely to enhance their business in these categories. This confirms the

results from the pilot interviews where a lack of perceived usefulness/benefit was identified as a barrier to initial or subsequent adoption.

The results also confirm previous Canadian research discussed in the literature review that non-adopters and firms that have adopted basic technologies do not appear to understand the benefits associated with additional adoption. Research in other geographical regions came to similar conclusions. Levy and Powell (2003), Looi (2005) and Riemenschneider, Harrison and Mykytyn (2003) found that the SMEs do not have knowledge about the benefits of e-commerce and this is negatively impacting adoption. This confirms the findings in Fast Forward 5.0 (2004) and Net Impact IV (2004) that the various levels of government, vendors and consultants have to do a better job of first educating SMEs about the benefits of adopting Internet technology prior to their adoption.

Effort Expectancy

The analysis of the survey data illustrated that SMEs are unsure about the effort involved in the adoption of e-commerce. Firms described their ability to use the next level of e-commerce as neither likely nor unlikely indicating that they lack confidence to use the next level technology and are unsure about the effort involved. These findings confirm the results in the pilot study.

The literature in Chapter 2 resulted in similar results. SMEs appear to be unsure about the efforts involved in adopting sophisticated e-commerce. As noted in Fast Forward 5.0 SME owners believe that sophisticated technologies may increase their or their employees' workload thus hindering adoption. This supports the assertion above that education may be the key to facilitate future adoption.

Social Influence

Empirical evidence indicates that most respondents do not feel that their co-workers, staff or people in their reference group would be supportive of their adoption of e-commerce. This differs from results in the pilot study where firms indicated that suppliers and other reference groups would be supportive and act as facilitators of adoption.

Results discussed in the literature review also revealed contradictory results as Riemenschneider and McKinney (2001–2002) found that SMEs did not identify support among their social group for the adoption of the technology. Other research (Grandon & Pearson 2004a, 2004b 2003; Wu, Mahajan & Balasubramanian 2003) indicated people external to the company influence the adoption of technology. The difference in results may be explained by the questions that were posed in the research. This research did not specifically ask about the influence of customers, suppliers, competitors or government. Therefore respondents may not have considered them in their answers.

CEO Innovation & Knowledge

Results indicated that CEOs/Top Managers felt that they leaned towards being somewhat innovative and would consider trying out new technologies. In addition respondents felt that they had enough knowledge to use basic technologies. These

results confirm research by Thong (1999) that managers feel that they are somewhat innovative and that they describe their knowledge as acceptable but not strong or confident (Looi 2005; Johnston, McClean & Wade 2004; Levy & Powell 2003).

Employee Knowledge

Empirical results reveal that most firms felt their employees had acceptable IT knowledge and one employee had enough knowledge to be considered an expert. These results contradict Canadian research (Fast Forward 5.0) that indicates that the lack of employees with IT knowledge is hindering e-commerce adoption. The difference may be a result of how questions were asked and analyzed. Research in the Fast Forward and Net Impact studies focused on whether employees had formal IT training and education. Thus their results reveal that most SMEs lack employees with formal IT training. This research asked if one employee is a computer expert with no mention of formal training. This research allowed for an expanded definition of computer experts. The research indicated that decision makers believe that at least one employee is a computer expert. Mombourquette (2007) found that among Atlantic Canada small tourism operators, most owners felt that one employee was an expert supporting this assertion. SMEs appear to be using a broader definition of expert and may be willing to substitute formal training with actual hands-on practice.

6.2.4 Summary of Perceptions of Decision Makers towards the Adoption of E-commerce

As illustrated above SME managers and CEOs are unsure about the impact of adopting or furthering their adoption of e-commerce. Owners appear to lack knowledge about specific benefits, are not confident in their ability to use new technology and do not identify people in their peer group that will positively impact their decision to adopt. In addition while owners/CEOs appear to feel that they are somewhat innovative, have some degree of knowledge and that their staff also has some knowledge they are not over confident in their own or their staff's ability. The next section will examine the factors discussed in this section and if they can explain SMEs variance in current use and intentions to adopt e-commerce.

These findings on the perceptions of decision makers have several theoretical implications. The results support previous research conducted by the Canadian government by both Statistics Canada and in the Fast Forward and Net Impact series that Canadian SME owners are generally unsure and unaware about the benefits associated with the adoption of e-commerce. This confirms research from other countries that was discussed in Chapter 2 (Levenburg & Magal 2005; Levenburg 2005; Grandon & Pearson 2004b). One possible solution is for the government, consultants and vendors to focus on educating SMEs' owners first, rather than trying to get them to embrace new technology adoption without them understanding the benefits.

6.2.5 Current Level of Adoption - Testing the Model

This section will statistically test the final model to see if it can explain variance in current e-commerce use. As indicated in Chapter 5, multiple regression and discriminant analysis was used to statistically test the model. The tests all conclude

that the model does not explain the variance in the current state of e-commerce adoption. The first multiple regression test was more sophisticated than the latter regression analysis and it determined that the model only explained 10.8% variance in use. While three factors were used in the test, only one consisting of CEO Innovativeness and CEO and Employee knowledge was significant. A further discriminant analysis resulted in the same conclusion that the model was not useful in classifying high and low adopters.

These results indicate that much of the variance in adoption cannot be explained by the model and other constructs would have to be considered. Theoretically, this is contradictory to the research noted in the literature as a number of models that consisted of similar constructs explained between 15-45% of the variance in adoption. A number of factors may explain the low variance explained in this research. The region where the study took place is considered to be a 'have not' region of the country and the investment associated with the adoption of e-commerce may have more significant implications than what is reported in the literature. Due to the economic condition of the area, the government also plays a significant role in the economic development of the region and perhaps this should have been considered as a facilitator. Furthermore, while performance and effort expectancy did not significantly influence the current level of adoption of technology by SMEs, the mean scores reveal that SMEs are unsure about the impact of these constructs. Perhaps the survey should have been more explicit in identifying specific performance related questions such as improve sales, improve marketing and so forth.

6.2.6 Intentions to Adopt More Sophisticated Technologies - Testing the Model

The model was then tested to see if it could explain variance in intentions to adopt e-commerce or adopt more sophisticated technologies (main research question). The statistical tests were the same as above and consisted of both multiple regression and discriminant analysis. The sophisticated regression analysis revealed that the model explained 35.5% of the variance in intentions to adopt the next level of technology and Performance and Effort Expectancy and Social Influence had a significant impact on firms' intentions to adopt or increase their adoption of more sophisticated technologies. The simpler regression analysis resulted in 38.4% of the variance being explained. The discriminant analysis which used factor analysis as a base found that the model correctly classified 68.5% of original cases and 67.1% of cross-classified cases with 40.1% of the variance explained by Performance Expectations, Social Influence, Effort Expectations. The second discriminant analysis found that the model correctly classified 67.1% of original cases and 65.3% of cross-classified cases explaining 45% of the variation.

The results indicate that a significant percentage of the variance in intentions to adopt e-commerce or further adopt e-commerce can be explained by the model. The model explained roughly 35 – 38% of the variance and accurately classified 65 – 67% of cases based on their intentions to adopt. While these results are significant and are comparable to other models and research (Grandon & Pearson 2004; Premkumar & Roberts 1999) they do not provide a superior explanation of variance compared to other research.

The constructs proposed by Venkatesh et al. (2003) in their UTAUT were the only significant constructs in this research. As expected, factors relating to improving a firm's performance, influence of social networks and the ease of using new technology were found to influence adoption. As noted in Chapter 2 in both the IT and e-commerce adoption sections of the literature review, these constructs have been consistently identified as factors that significantly influence adoption. The most consistent factors in the research (Chapter 2) were factors that relate to improving a businesses performance (relative advantage, perceived usefulness, perceived benefits) and this was the case here as well. While Chapter 2 stated that both social influences (peer, competitor) and effort factors (complexity, ease of use) had resulted in some mixed findings in the past, both are significant in this study providing further evidence of their role as a facilitator of adoption.

The model found that factors relating to the firm's Top Management/CEO, employees' knowledge and firm size are not significant predictors of adoption intentions. This research was contradictory to the literature. Studies discussed in Chapter 2 noted consistent support for the role of the CEO's innovativeness (Thong 1999) and knowledge (Konstadakopulos 2006; Lee 2004; Abdullah 2002). The lack of support for CEO/Top Management Innovativeness and Knowledge may result from the increasing use of the Internet and e-commerce whereas decision makers may feel that they have enough knowledge to complete basic operations and that the technology is no longer an innovation. This may also explain the lack of support for the employee knowledge construct. Additionally, subsequent research (Mombourquette 2007) on employee knowledge of e-commerce revealed that while few SMEs in Atlantic Canada employed an IT trained specialist, most top managers felt someone within the firm was an expert based on informal training, such as hands-on practice and/or trial and error. While firm size was not a significant factor in the model this was not entirely unexpected as the literature did note that the link between size and adoption intentions has resulted in mixed findings in other research. The contradictory findings may also be a result of the unique characteristics of the Atlantic Canadian region where the study occurred.

The results indicate that other factors must be considered in order to gain a larger understanding of the variance in Atlantic Canada's SMEs' adoption intentions. The model used in this research did not make use of a common factor cited in Chapter 2 'CEO/Top Management Support'. This was based on parsimonious purposes and the assertion that in order for a top manager to support investment in e-commerce they would have to be both innovative and knowledgeable (Thong 1999). As e-commerce becomes increasingly common this assertion may not hold true and the construct should be considered in future research.

In addition the unique features of the Atlantic Canada region may account for some of the unexplained variance. As discussed in Chapter 2, the region lacks investment dollars and smaller business in the area face more challenges than in other areas of the country. So while the costs of investing in e-commerce are relatively low they may be more of an issue in Atlantic Canada. A construct that deals specifically with costs or access to money to invest in technologies may result in additional explanation of variance. Furthermore the government plays a major if not a dominant role in the regional economy as an author of economic development policies, a supplier of investment dollars, as an educator/consultant, and a customer. Thus, accounting for the influence of the government may provide further

explanation of SMEs' adoption intentions. The role of IT vendors and consultants while unsupported in the case study research for this dissertation may also warrant further investigation based on the active role of the government in the region's economy. While it is unlikely that the rural areas of Atlantic Canada would have access to professional consultants the literature did not consider the role of government consultants who often have the official title of regional development directors/representatives. These development directors shape SME management practices by educating managers on current trends and aiding the government in selecting policies that facilitate actions. Mombourquette (2007) found that the government was the main facilitator of e-commerce in Atlantic Canada SME tourism operators.

While the model did explain a significant amount of variance, a summary discussion about the mean scores for the constructs may provide some additional insight into the owner/CEO's mindset about e-commerce. As noted above the majority of respondents appear to be unsure about the impact of adopting or furthering their adoption of e-commerce. This uncertainty appears to be most likely explained by a lack of knowledge of sophisticated technologies and their benefits. Since there is such a high level of reservation about adopting new technologies it would appear that the government, consultants and vendors should focus on educating SMEs prior to attempting to facilitate adoption.

The results from this research provide several theoretical implications. Theoretically the results provide evidence that the constructs in the UTAUT model (Venkatesh 2003) can be applied to explain variance in SMEs' intentions to adopt or further their adoption of e-commerce. Previously their model was only tested on employee adoption. The findings also strengthen the assertion that Social Influence and Effort Expectancy are facilitators of adoption particularly in the Atlantic Canada region, while the CEO/Top Manager's innovativeness and knowledge, employee knowledge do not facilitate the adoption of e-commerce in Atlantic Canada. In addition the findings provide further evidence that SMEs do not understand or are unsure about the benefits associated with adopting e-commerce technologies.

6.3 Implications for Policy and Practice

The potential applications from this research as they relate to policy and practice are discussed in this section.

6.3.1 Policy Making & Government Regional Development

With SMEs being so important to the Atlantic Canadian economy and e-commerce being so important to SMEs the results of this research could lead to significant policy changes. The research indicates that SMEs in Atlantic Canada are either not adopting e-commerce or are only adopting basic technologies. Furthermore SMEs do not appear to have intentions to increase the intensity of their adoption. In light of this the government and its various regional development agencies should encourage SMEs to embrace the adoption of e-commerce by educating SMEs on the benefits of adoption and by offering monetary incentives.

The research indicates that this lack of intentions is most likely due to concerns about the technology being useful, ease of use and whether important others (peers) think

they should be using this technology. Thus the government should shape their educational programs to focus on explaining the benefits of e-commerce to SMEs and its ease of use. Educational cases should also highlight example of similar companies (peers) that have adopted the technology and their resulting success. Furthermore this research strengthens the assumption that a primary decision maker usually makes the adoption decision for SMEs thus educational programs should concentrate on individual or micro delivery methods which should allow for a greater individualization of material.

The government is urged to place a greater emphasis on the adoption of e-commerce by SMEs. In particular, the government will have to invest money to encourage the adoption of e-commerce. SMEs especially SMEs in the rural regions are small and lack the financial resources to adopt e-commerce. The government should either offer support in the form of tax breaks or monetary incentives to encourage adoption. Additionally the education programs offered by the government should be offered at a low cost or free to participants. All of the provinces in Atlantic Canada have continued to invest in the expansion of broadband technologies but too many areas are still without this service. Government should increase their investment in this area to enable all SMEs, regardless of their location, to access this technology.

Since research has indicated that SMEs adopt e-commerce in linear stages/steps the government may consider encouraging SMEs to first adopt basic technologies prior to adopting more sophisticated technologies. For example, if a group of SMEs is using a website only for marketing purposes, the government may introduce educational programs or incentives aimed at encouraging them to sell or buy goods online rather than a host of technologies at once, which SME decision makers may not see as useful.

The results also indicate that national research programs such as the Net Impact and Fast Forward series are not providing a truly accurate description of e-commerce use in Canadian SMEs due to limitations in their methodology. The most notable limitations include the exclusion of micro and small companies from their surveys and the geographic focus of their case studies. If the government wants these research programs to gain a true understanding of the state of e-commerce in Canada the research methods must be broadened. The same holds true for Statistics Canada who continues to limit participation in their annual survey on business use of the Internet to firms with at least $250,000 in revenue. This survey reveals that many firms would be excluded from participation resulting in incomplete results and biased findings.

6.3.2 Consultants & Vendors

IT consultants and vendors should pay particular attention to the findings in this research. Results reveal that SMEs in Atlantic Canada have yet to fully embrace the use of e-commerce technologies making the market attractive to more participation from these two groups. Since research indicates that SMEs have only adopted basic technologies consultants and vendors should focus on having firms adopt the next level of e-commerce and progressively move companies up the adoption scale.

Results also illustrate that consultants and vendors should focus their efforts on educating SMEs about the benefits of adoption and the ease of use of the technology

either prior to or as part of their services. Education should be individualized and include examples of peers successfully using the technology.

6.3.3 Owner-Managers

Owner-Managers who are actively investing in e-commerce should continue to do so based on the results in this research. The investment should provide good business results based on what was discovered in the literature review. Furthermore as some SMEs appear to be unwilling to adopt or to increase the intensity of their adoption those that embrace e-commerce should have access to greater marketing opportunities and to decrease their costs. SMEs which are unwilling to adopt any technology should realize that this action may hinder their business as they may miss out on potential sales and cost savings opportunities.

The research should also provide owner-managers with some comfort about their lack of knowledge about e-commerce and its benefits. The majority of those surveyed appear to share the same knowledge base as they are comfortable with basic technologies but are unsure about sophisticated applications. This lack of knowledge should provide support for owner-managers in demanding more educational opportunities from government, consultants and vendors. Furthermore as previously discussed results indicate that SME adoption of e-commerce is low and not likely to improve therefore owner-managers should start to demand more from the government in terms of monetary incentives and education opportunities to encourage adoption.

6.4 Limitations

A number of limitations on this research are acknowledged. The empirical data gathered in the pilot studies and in the large empirical survey have relied on the information from single respondents. This is problematic as it does not allow for the cross checking of information with other respondents in the firm. Additionally it reduces the complexity of an important decision down to the viewpoint of only one person. However, it is reasonable based on the discussion in the literature review about SME management practices and IT/e-commerce adoption; the collection of information from the owner or CEO/Top Manager does constitute a valid source of empirical data. Furthermore respondents were asked to rank their influence on e-commerce decisions on a scale of 0% to 100% and any respondent who indicated that they exercised less than 50% influence was not surveyed. The average influence on e-commerce decisions for the survey was 78% and this indicates that respondents were the primary e-commerce decision makers. Further research could address this issue by collecting data from multiple respondents and/or by measuring a firm's use of e-commerce through observation or electronic monitoring.

Second, the survey was executed only in Atlantic Canada which as discussed in Chapter 2 is unique in the country in terms of the economy, culture, and business environment. Thus the conclusions drawn from this research may have a potential problem of lack of generalisability. But some research indicates that the difference in adoption from various geographical regions is minor. The survey should be replicated in other areas of the country and internationally to provide further theoretical support. Furthermore while the researcher acknowledges that

geographical differences may impact upon results, accounting for these differences is beyond the scope of this dissertation.

Third, there was a lack of opportunity to collect longitudinal data, and the research reflects only one period in time, thus making it difficult to make predictions based on time trends. While there is some gap in the time period between the pilot studies and the full survey the time period was relatively short. Further research could address this by collecting longitudinal data.

Lastly, non-response error must also be considered as the response rate for the survey was 17%. The research concluded this was not a factor as demographic information from the region was compared with demographic information of the respondents and no significant difference was found. This indicates that non-response bias was not a factor in the results. Further research may consider providing participants with some form of incentive to increase participation but the response rate may not improve as numerous studies that use the same target population report similar response rates. Additionally McDaniel and Gates (1993) found that in all the IT research that compared non-respondents to respondents, none reported any meaningful difference.

6.5 Recommendations for Further Research

There are several recommendations for further research. Firstly, the replication of the study in other parts of Canada or internationally will enable further testing of the model and lead to a better understanding of e-commerce activity and facilitators. This will advance the literature and in Canada determine an accurate benchmark to compare future e-commerce activity. In addition research could incorporate cultural differences to determine the role they play in e-commerce use and adoption intentions.

Secondly, research could be conducted in the Atlantic Canadian region with the aim of gaining a better understanding of why firms have adopted e-commerce to date. In addition other factors such as the role of government, vendors, consultants and top management support should be investigated as facilitators of intentions to adopt e-commerce. This investigation of other factors is important in theory building and offers a number of practical implications.

Thirdly, research could expand beyond asking responses from a single informant to multiple respondents. Researchers could compare if the reported use of e-commerce activity differs and gain insight into the entire firm decision making process. As the majority of literature relies on the use of single informants this research would allow for comparisons of results that will expand the literature.

Fourthly, this study is the first to measure the e-commerce activity and frequency of use among Atlantic Canada SMEs with no restrictions such as size of the firm or revenue thus providing a benchmark for e-commerce activity in the region. Subsequent studies should be carried out to determine if there is growth in adoption rates. In addition it was beyond the scope of this research to measure the impact of e-commerce adoption in the region but this is something that should be explored in the future.

Lastly, a number of longitudinal studies could be conducted. A follow up study could be carried out to see if firms acted on their intentions and the facilitators and barriers they encountered. In addition studies could be carried out to measure changes in perceptions of e-commerce facilitators. Finally research could be conducted to determine the positive impact of adopting e-commerce and to investigate if there were any negative implications among non-adopting firms.

6.6 Conclusion

The final chapter of this dissertation provided a summary of the research. It discussed the findings, the theoretical implications and compared the results to the literature to gain an understanding about how the findings contribution to the research. The chapter then described the practical implications prior to assessing the limitations of this dissertation and providing direction for future research.

In brief this research has provided an understanding of the use of e-commerce among SMEs in Atlantic Canada, the perceptions decision makers have about the technology and the facilitators of e-commerce adoption intentions. This research has the potential to create awareness of the low level of e-commerce adoption and create solutions to this problem.

REFERENCES

Abdullah, MA 2002, 'Entrepreneurs and their influence on the usage of information technology in SMEs: Evidence from Malaysia', *Journal of Small Business and Entrepreneurship*, vol. 16, no. 2, pp. 60-77.

Abell, W & Limm, L 1996, 'Business use of the internet in New Zealand: An exploratory study', viewed May 8, 2002, <http://www.scu.edu.au/sponsored/aus web96>.

ACOA 2005, see Atlantic Canada Opportunity Agency 2005.

ACOA 1998, see Atlantic Canada Opportunity Agency 1998.

ACOA 1996, see Atlantic Canada Opportunity Agency 1996.

Agarwal, R & Prasad, J 1997 'The role of innovation characteristics and perceived voluntariness in the acceptance of information technologies,' *Decision Sciences*, vol. 28, no. 3, pp. 557-582.

Ajzen, I 1991, 'The theory of planned behavior', *Organizational Behavior and Human Decision Processes*, vol. 50, p. 32.

Ajzen, I & Fishbein, M 1980, *Understanding Attitudes and Predicting Social Behavior*, Prentice Hall, New Jersey.

Alpar, P & Reeves, S 1990, 'Predictors of MS/OR application in small businesses', *Interfaces*, vol. 20, no. 2, pp. 2-11.

Amba-Rao, SC & Pendse, D 1985, 'Human Resource Compensation and Maintenance Practices', *American Journal of Small Business*, fall, pp. 19-29.

Atlantic Canada Opportunity Agency 2005, *The State of Small Business and Entrepreneurship, Atlantic Canada - 2005*, viewed June 12, 2006, <www.acoa-apeca.gc.ca>.

----1998, *The State of Small Business and Entrepreneurship in Atlantic Canada - 1998*, viewed June 12, 2006, <http://dsp-psd.pwgsc.gc.ca/Collection/C89-4-47-1998E.pdf>.

----1996, *The State of Small Business and Entrepreneurship in Atlantic Canada - 1996*, viewed June 12, 2006, <http://dsp-psd.pwgsc.gc.ca/Collection/C89-1-3-1996E. pdf>.

Atkins, MH & Lowe, JF 1996, 'Sizing up the small firm: UK and Australian experience', *International Small Business Journal*, vol. 15, no. 3, pp. 44-45.

Atkinson, J & Storey, D 1994, 'Small firms and employment', *Employment, The Small Firm and the Labour Market*, J Atkinson and D Storey (eds.), Routledge, London, pp. 1-27.

Auger, P & Gallaugher, JM 1997, 'Factors affecting adoption of an internet-based sales presence for small businesses', *The Information Society*, vol. 13, no. 1, pp. 55-74.

Baldwin, JR, Gellatly, G & Gaudreault, V 2000, 'Financing innovation in new small firms: new evidence from Canada', prepared for Statistics Canada, Micro-Economic Analysis Division.

Barba-Sánchez, Martínez-Ruiz & Jiménez-Zarco 2007, 'Drivers, benefits and challenges of ICT adoption by small and medium-sized enterprises (SMEs): a literature review', *Problems & Perspectives in Management*, no. 1, pp. 103-114.

Barnes, M, Coulton, L, Dickinson, T, Dransfield, S, Field, J, Fisher, N, Saunders, I & Shaw D 1998, 'A new approach to performance measurement for small and medium enterprises', in Neely, A. (ed.): *Performance Measurement: Theory and Practice*, University of Cambridge, Cambridge, UK, pp. 86-92.

Barry, H & Milner, B 2002, 'SME's and electronic commerce: A departure from the traditional prioritization of training?' *Journal of European Industrial Training*, vol. 25, no. 7, pp. 316-326.

Beck, R, Wigand, RT & König, W 2005, 'The diffusion and efficient use of electronic commerce among small and medium-sized enterprises: an international three-industry survey', *Electronic Markets*, vol. 15, no. 1, pp. 38-52.

Berger, I 1993, 'A framework for understanding the relationship between environmental attitudes and consumer behaviors', *Marketing Theory and Application*, no. 4, pp. 157-163.

Berger, AN & Udell, GF 1998, 'The economics of small business finance: the roles of private equity and debt markets in the financial growth cycle', *Journal of Banking and Finance*, vol. 22, pp. 1-68

Biggers, A 2005, 'IP technology breaks through to small business', *New Mexico Business Journal*, December, pp. 24-25.

Binks, MR & Ennew, CT 1996, 'Growing firms and the credit constraint', *Small Business Economics*, vol. 8, no. 1, p. 17-25.

Birley, S & Niktari, N 1995, *The Failure of Owner-Managed Businesses*, BDO Stoy Hayward, London.

Blair, EA & Burton, S 1987, 'Cognitive processes used by survey respondents to answer behavioral frequency questions,' *Journal of Consumer Research*, vol. 14, pp. 280-288.

Blair, T 2000, Press release re the launch of UK Online opengov site, UK Prime Minister's office, London.

Bouchard, L 1993, 'Decision criteria in the adoption of EDI', paper presented to the 13th International Conference on Information Systems, Orlando, Florida.

Bourgeois, A 2006a, 'Small Business Profile: New Brunswick's Small and Mid-sized Business Sector', *CFIB Research*, January.

---- 2006b, 'Small Business Profile: Prince Edward Island's Small and Mid-sized Business Sector', *CFIB Research*, January.

---- 2006c, 'Small Business Profile: Nova Scotia's Small and Mid-sized Business Sector', *CFIB Research*, March.

---- 2006d, 'Small Business Profile: Newfoundland and Labrador's Small and Mid-sized Business Sector', *CFIB Research*, March.

Brigham, EF & Smith, K 1967, 'The cost of capital to the small firm', *The Engineering Economist*, vol. 13, no. 1, p. 26.

Bryman, A & Cramer, D 1990, *Quantitative Data Analysis for Social Scientists*, Routledge, New York, NY.

Buhalis, D & Deimezi, O 2003, 'Information technology penetration and E-commerce developments in Greece, with a focus on small to medium-sized enterprises', *Electronic Markets*, vol. 13, no. 4, pp. 309-324.

Burgess, S Sellitto, C & Wenn, A 2005, 'A longitudinal study of Australian winery web sites (2000-2002), *Information Systems in an E-World*, eds Hunter, G and Wenn, A. Information Institute, Washington, USA. pp. 178-192. *Business Register*, 2003, June edn, Statistics Canada.

Business Wire, 2000, 'Having a web site pays off for small business,' viewed December 15, 2000, <http://pub76.ezboard.com/fnubianbusiness financeinvestment.showMessage? topicID =54.topic>.

Calderia, MM & Ward, JM 2002, 'Understanding the successful adoption and use of IS/IT in SMEs: an explanation from Portuguese manufacturing industries', Information Systems Journal, vol. 12, no. 2, pp. 121-152.

Canadian Census Report, 2006, viewed January 2, 2007, <http://www12.statcan.ca/ english/census06/release/index.cfm>.

Canadian Census Report, 2001, viewed March 4, 2002, <http://www12.statcan.ca/ english/census01/release/index.cfm>.

Carroll, M, Marchington, M & Earnshaw, J 1999, 'Recruitment in small firms: processes, methods and problems', *Employee Relations*, vol. 21, no. 3, pp. 236-250.

Carson, D & Cromie, S 1989, 'Marketing planning in small enterprises: A model and some empirical evidence', *Journal of Marketing Management* vol. 5, no. 1, pp. 33-49.

Cassell, C, Nadin, S & Gray, MO 2001, 'The use and effectiveness of benchmarking in SMEs', *Benchmarking: An International Journal,* vol. 8, no. 3, pp. 212-222.

Cecora, J 2000, 'Entrepreneurs and SMEs in regional economies: policy issues for sustainable development in a globalizing economy', International Review of Sociology, vol. 10, no. 1, pp. 83-100.

Canadian Federation of Independent Business 2000, *Most Canadian businesses are very small*, viewed February 15, 2003, <http://www.cfib.ca/primer/ primer_e/sld003. htm>.

CeBI 2003, *Net Impact III: Overcoming the Barriers,* publication of the Canadian eBusiness Initiative, October.

CFIB – see Canadian Federation of Independent Business

Charan, R, Hofer, CW & Mahon, JF 2001, 'From Entrepreneurial to professional management: A set of guidelines', *Journal of Small Business Management,* pp. 1-10.

Chau, PYK & Hui, KL 2001, 'Determinants of small business EDI adoption: an empirical investigation', *Journal of Organizational Computing and Electronic Commerce,* vol. 11, no. 4, pp. 229-252.

Chau, SB & Turner, P 2001, 'A four phase model of EC business transformation amongst small to medium sized enterprises: preliminary findings from 34 Australian case studies', paper presented to Twelfth Australasian Conference on Information Systems, Coffs Harbour, NSW, Australia, 5-7 Dec 2001.

Chaudhury, A & Kuilboer, JP 2002, *E-Business and E-commerce Infrastructure,* McGraw-Hill, Boston, MA.

Chaundy, D 2007, 'Where have all the workers gone? Why Atlantic Canada's labour force has stopped growing and what we can do about it,' a publication of the Atlantic Provinces Economic Council (APEC), January 5.

Chen, J-C & Williams, BC 1993, 'The impact of microcomputer systems on small businesses: England, 10 years later', *Journal of Small Business Management,* July, pp. 96-102.

---- 1998, 'The impact of electronic data interchange (EDI) on SMEs: Summary of eight British case studies', *Journal of Small Business Management,* October, pp. 68-72.

Ching, HL & Ellis, P 2004, 'Marketing in cyberspace: What factors drive e-commerce adoption?' *Journal of Marketing Management*, vol. 20, pp. 409-429.

Churchill, N & Lewis, V 1983, 'The five stages of small business growth', *Harvard Business Review*, vol. 61, May-June, pp. 30-50.

Chwelos, P, Benbasat, I & Dexter, A 2001, 'Research report: Empirical test of an EDI adoption model', *Information Systems Research*, vol. 12, no. 3, pp. 304-321.

Cisco 2005, *Net Impact: United States Private Sector*, 2nd edn., a publication of Cisco Systems Inc.

Francis, G, Hinton, M, Holloway, J & Mayle, D 1993, 'A role for management accountants in best practice benchmarking', Chartered Institute of Management Accountants (CIMA).

Cloete, E, Courtney, S & Fintz, J 2002, 'Small businesses' acceptance and adoption of e-commerce in the Western-Cape Province of South Africa', *EJISDC*, vol. 10, no. 4, pp. 1-13.

Coakes, SJ & Steed, LG 1999, *SPSS Analysis without Anguish*, John Wiley, Brisbane, Australia.

Cochran, AB 1981, 'Small business mortality rates: A review of the literature', *Journal of Small Business Management*, vol. 19, no. 4, p. 9.

Collins, R 2005, 'Not too late for corporates to join SMEs in optimizing search', *New Media Age*, April 14, p. 13.

Compeau, DR & Higgins, CA 1995a, 'Application of social cognitive theory to training for computer skills', *Information Systems Research*, vol. 6, no. 2, pp. 118-143.

----1995b, 'Computer self-efficacy: development of a measure and initial test', *MIS Quarterly*, vol. 19, no. 2, pp. 189-211.

Cooper, DR & Schindler, PS 1998, *Business Research Methods*, 6th edn., McGraw-Hill Irwin, New York, NY.

---- 2001, *Business Research Methods*, 7th edn., McGraw-Hill Irwin, New York, NY.

Cosh, AD, Duncan, J & Hughes, A 1996, 'Profitability and finance', in Cosh, AD and Hughes, A (eds), *The Changing State of British Enterprise*, SBRC, Cambridge.

Costello, G & Tuchen, J 1998, 'A comparative study of business to consumer electronic commerce', *Journal of Information Technology*, vol. 13, p. 14.

Cragg, PB & King, M 1993, 'Small-firm computing: Motivators and inhibitors', *MIS Quarterly*, vol. 17, no. 1, pp. 47-60.

Cragg, PB & Zinatelli 1995, 'The evolution of information systems in small firms', *Information & Management*, vol. 29, p. 8.

Crano, WD & Brewer, MB 2002, *Principles and methods of social science research*, 2nd edn., Mahwah, NJ.

Crawford, RL & Ibrahim, AB 1985, 'A strategic planning model for small businesses', *Journal of Small Business Entrepreneur*, vol. 3, no. 1, p. 8.

Cressy, R & Olofsson, C 1997, 'European SME Financing: An Overview', *Small Business Economics*, vol. 9, p. 9.

Cromie, S 2000, 'Assessing entrepreneurial inclinations: Some approaches and empirical evidence', *European Journal of Work and Organizational Psychology*, vol. 9, no. 1, pp. 7-30.

Culkin, N & Smith, D 2000, 'An emotional business: A guide to understanding the motivations of small business decision takers', *Qualitative Market Research: An International Journal*, vol. 3, no. 3, p. 12.

Damanpour, F 2001, 'E-business, e-commerce evolution: perspective and strategy', *Managerial Finance*, vol. 27, no. 7, pp. 16-33.

Daniel, EM & Grimshaw, DJ 2002, 'An exploratory comparison of electronic commerce adoption in large and small enterprises', *Journal of Information Technology*, vol. 17, pp. 133-147.

Daniel, E & Wilson, H 2002, 'Adoption intentions and benefits realized: A study of e-commerce in UK SMEs', *Journal of Small Business and Enterprise Development*, vol. 9, no. 4, pp. 331-348.

Daniel, E, Wilson, H & Myers, A 2002, 'Adoption of e-commerce by SMEs in the UK', *International Small Business Journal*, vol. 20, no. 3, pp. 253-270.

Davis, F, Bagozzi, R & Warshaw, P 1992, 'Extrinsic and intrinsic motivation to use computers in the workplace', *Journal of Applied Social Psychology*, vol. 22, no. 14, pp. 1111-1132.

Davis, F, Bagozzi, R & Warshaw, P 1989, 'User acceptance of computer technology: A comparison of two theoretical models', *Management Science*, vol. 35, no. 8, pp. 982-1003.

Davis, FD 1989, 'Perceived usefulness, perceived ease of use, and user acceptance of information technology', *MIS Quarterly*, September, p. 21.

Davis, J 2001, 'Mom and Pop go online', *InfoWorld*, vol. 23, no. 22, p. 1.

Deakins, D 1996, *Entrepreneurship and Small Firms*, McGraw-Hill, Maidenhead.

Debus, A 2005, 'Small Business Profile: An Overview of Canada's Small and Mid-Sized Business Sector', CFIB *Research.*

de Klerk, S 2005, 'E-commerce adoption in South African businesses', *South African Journal of Business Management*, vol. 36, no. 1, pp. 33-40.

de Klerk, S & Kroon, J 2005, 'E-commerce adoption in South African businesses', *South African Journal of Business Management*, vol. 36, no. 1, pp. 311-322.

Delisle, S & St-Pierre, J 2004, 'Decision support for SME owners-managers: a performance evaluation benchmarking tool', in *Decision Support in an Uncertain and Complex World: The IFIP TC8/WG8.3 International Conference*, pp. 202-212.

DeLone, WH 1988, 'Determinants of success for computer usage in small business', *MIS Quarterly*, vol. 12, no. 1, pp. 51-61.

Department of Trade and Industry 1999, Moving into the Information Age: An International Benchmarking Study 1998, viewed November 23, 2001, <http://www.isi.gov.uk/bench>.

Desjardins, P-M, Hobson, PAR & Savoie, D 2000, 'Trade, equalization and regional disparities in Canada', prepared for the Canadian Institute for Research on Regional Development, University of Moncton, Moncton, New Brunswick.

De Vaus, DA 2002, *Surveys in Social Research*, 5th edn., Allen & Unwin, Sydney, Australia.

Dewar, RD & Dutton, JE 1986, 'The adoption of radical and incremental innovations: An incremental analysis', *Management Science*, vol. 32, Nov, p. 11.

Di Eugenio, B 2000, 'On the usage of Kappa to evaluate agreement on coding tasks', paper presented to LREC2000, The Second International Conference on Language Resources and Evaluation, Athens, Greece.

Drennan, J & Kennedy, J 2000, 'Internet acceptance and use by small firms: A study of the pharmacy sector', paper presented to the 45th ICSB World Conference, Brisbane, 7-10 June.

DTI 1999, see Department of Trade and Industry 1999.

Dulipovici, A & Kahn, B 2003, 'Small Business - Big Picture', *CFIB Research.*

Dun and Bradstreet 2004, '20th Annual Small Business Survey', viewed December 4, 2005, <*www.dnb.com*>.

Dutta, S & Evrard, P 1999, 'Information technology and organization within European small enterprises', *European Management Journal*, vol. 17, no. 3, p. 12.

ECaTT 2000, 'Benchmarking progress on new ways of working and new forms of business across Europe', viewed January 29, 2002, <http://www.ecatt.com/>.

'Economic Transformation in Atlantic Canada', 2005, *The Policy Forum,* Ottawa, December.

Economist Intelligence Unit 2004, *The 2004 e-Readiness Ranking Report*.

Edbert, RJ, Griffin, RW & Starke, FA 2006, *Business Essentials*, 4th Canadian edn., Pearson Prentice-Hall, Upper Saddle River, NJ.

Eisenhardt, K 1989, 'Building theories from case study research,' *Academy of Management Review*, vol. 14, no. 4, pp. 532-50.

EIU 2004, see Economist Intelligence Unit 2004.

Elam, J 1988, *United Services Automobile Association (USAA) Case No 9-188-102*, Harvard Business School, Cambridge, MA.

Elgin, J, Licht, G & Steil, F 1997, 'Firm Foundations and the Role of Financial Constraints', *Small Business Economics*, vol. 9, pp. 137-150.

Ellram, LM 1996, 'The use of the case study method in logistics research,' *Journal of Business Logistics*, vol. 17, no. 2, pp.93-139.

EU 2002, see European Commission 2002.

EU 2000, see European Commission 2000.

European Commission 2002, 'Benchmarking national and regional e-business policies for SMEs', paper presented to the European Conference on Benchmarking National and Regional Policies in Support of e-Business for SMEs, Brussels, 20 June.

European Commission 2000, 'European survey of the information society', European Society Indicators in the Member States of the EU, viewed January 26, 2002, <www.europa.eu.in/ISPO/esis>.

Eveland, JD & Tornatzky, LG 1990, 'The deployment of technology: the processes of technological innovation', in LG Tornatzky and M Fleischer, Lexington Books, Lexington, Massachusetts, pp. 117-148.

Everett, J & Watson, J 1998, 'Small Business Failure and External Risk Factors', vol. 11, pp. 371-390.

Fast Forward 2000, *Accelerating Canada's Leadership in the Internet Economy*, Industry Canada, January.

Fast Forward 2.0 2001, *Taking Canada to the Next Level: Report on the Canadian E-Business Opportunities Roundtable*, Industry Canada, February.

Fast Forward 3.0 2002, *Maintaining the momentum,* Industry Canada, March.

Fast Forward 4.0 2003, *Growing Canada's Digital Economy,* Industry Canada, May.

Fast Forward 5.0 2004, *Making Connectivity Work for Canada,* Industry Canada, September.

'Feature Story', 2007, *Small Business Quarterly*, Industry Canada, vol. 9, no. 1, viewed June 1, 2007, <http://www.ic.gc.ca/epic/site/sbrp-rppe.nsf/en/rd02174e.html>.

Feigener, MK, Brown, BM, Derux, DR & Dennis WJ 2000, 'CEO stakes and board composition in small private firms', *Enterprise Theory and Practice,* vol. 24, no. 4, pp. 5-24.

Feldman, JM & Lynch, JG 1988, 'Self-generated validity and other effects of measurement on belief, attitude, intention and behavior', *Journal of Applied Psychology,* vol. 73, no. 3, pp. 421-435.

Feltham, TS, Feltham, GD & Barnett, JJ 2005, 'The dependence of family business on a single decision-maker', *Journal of Small Business Management,* vol. 43, no. 1, pp. 1-15.

Ferguson, GA 1971, *Statistical analysis in psychology and education,* 3rd edn., McGraw-Hill, New York.

Fichman, RG 1992, 'Information technology diffusion: a review of empirical research', paper presented to Thirteenth International Conference on Information Systems (ICIS), Dallas, Texas.

Fink, D 1998, 'Guidelines for the successful adoption of information technology in small and medium enterprises', *International Journal of Information Management*, vol. 18, no. 4, pp. 243-253.

Fishbein, M & Ajzen, I 1975, *Belief, Attitude, Intention and Behavior: An Introduction to Theory and Research,* Addison-Wesley, Reading, MA.

Flyvbjerg, B 2006, 'Five misunderstandings about case study research,' *Qualitative Inquiry*, vol. 12, no. 2, p. 26.

Fomin, VV, King, JL, Lyytinen, KJ & McGann, ST 2005, 'Diffusion and impacts of e-commerce in the United States of America: Results from an industry survey,' *Communications of the AIS,* vol. 16, p. 559-603.

Frank, MZ 1988, 'An intertemporal model of industrial exit', *Quarterly Journal of Economics*, vol. 103, no. 2, p. 2.

French, JRP & Raven, BH 1959, 'The basis of social power', in D Cartwright (ed), *Studies in Social Power,* Ann Arbor: University of Michigan, pp. 150-167.

Gaither, N 1975, 'The adoption of operations research techniques by manufacturing organizations', *Decision Sciences*, vol. 6, no. 4, p. 16.

Gallivan, MJ 2001, 'Organizational adoption and assimilation of complex technological innovations: development and application of a new framework', *The Database for Advances in Information Systems,* vol. 32, no. 3, pp. 51-85.

Gankema, HGJ, Snuif, HR & Zwart, PS 2000, 'The internationalization process of small and medium sized enterprises: An evaluation of stage theory', *Journal of Small Business Management*, vol. 38, no. 4, p. 12.

Garson, GD 2005, *Statnotes: Topics in Multivariate Analysis*, North Carolina State University, viewed October 17, 2004, <http://www2.chass.ncsu.edu/garson/pa765/stat note.htm>.

----2007, *Statnotes: Discriminant Function Analysis (Three Groups): SPSS Output,* North Carolina State University, viewed May 30, 2007, <http://www2.chass.ncsu.edu/garson/PA765/discrim3.htm>.

Gibbons, PT & O'Connor, T 2005, 'Influences on strategic planning processes among Irish SMEs', *Journal of Small Business Management,* vol. 43, no. 2, pp. 170-186.

Gibson, B & Cassar, G 2002, 'Planning behaviour variables in small firms', *Journal of Small Business Management,* vol. 40, no. 3, pp. 171-186.

Gloor, P 2000, *Making the E-Business Transformation: How to Succeed in the E-Commerce Economy*, Springer-Verlag.

Golhar, DY & Deshpande, SP 1997, 'HRM Practices of Large and Small Canadian Manufacturing Firms', *Journal of Small Business Management,* July, pp. 30-38.

Goode, S 2002, 'Management attitudes toward the world wide web in Australian small business', *Information Systems Management*, winter, pp. 45-48.

Gorsuch, RL 1983, *Factor Analysis,* 2nd edn., Lawrence Earlbaum Associates, Hillsdale, NJ.

Grandon, E & Mykytyn, PP 2004, 'Theory-based instrumentation to measure the intention to use electronic commerce in small and medium sized businesses', *Journal of Computer Information Systems*, vol. 44, no. 3, pp. 44-57.

Grandon, E & Pearson, JM 2004a, 'E-commerce adoption: Perception of managers/owners of small and medium sized firms in Chile', *Communications of the Association for Information Systems,* vol. 13, pp. 81-102

---- 2004b, 'Electronic commerce adoption: an empirical study of small and medium US businesses', *Information & Management,* vol. 42, no. 1, pp. 197-216.

---- 2003, 'Perceived strategic value and adoption of electronic commerce: An empirical study of small and medium sized businesses', paper presented to the 36th Hawaii International Conference on System Sciences (HICSS 2003), Hawaii.

Green, SB & Salkind, NJ 2003, *Using SPSS: Analyzing and Understanding Data,* Prentice Hall, Upper Saddle River, NJ.

Grimm, LG & Yarnold, PR 1995, *Reading and Understanding Multivariate Statistics*, American Psychological Association, Washington, DC.

Guba, G & Lincoln, Y 1994, 'Competing paradigms in qualitative research,' *Handbook of Qualitative Research,* eds. N. Denzin & Y. Lincoln, Sage Publications, Thousand Oaks, pp. 105-117.

Gummesson, E 2000, *Qualitative Methods in Management Research*, 2nd edn, Sage Publications, Thousand Oaks.

Hair, JF, Anderson, RE, Tatham , RL & Black WC 1998, *Multivariate data analysis,* 5th edn., Prentice-Hall International, Upper Saddle River, New Jersey.

Hambrick, D & Finkelstein, S 1987, 'Managerial discretion: a bridge between polar views of organizational outcomes', in B Staw and LL Cummings, *Research in Organizational Behavior,* JAI Press, Greenwich, pp. 369-406.

Handy, C 1988, *The Making of Managers*, NEDO/MSC/BIM, London.

Harris, MM 1989, 'Reconsidering the employment interview: a review of recent literature and suggestions for future research', *Personnel Psychology*, vol. 42, no. 4. pp. 691-726.

Harrison, RT & Mason, CM 1987, 'The regional impact of the Small Firms Loan Guarantee Scheme in the United Kingdom', in *Small Business Development: Some Current Issues,* Avebury, Aldershot, pp. 121-143.

Harrison, DA, Mykytyn, PP & Riemenschneider, CK 1997, 'Executive decisions about IT adoption in small business: Theory and empirical tests', *Information Systems Research, A Journal of the Institute of Management Sciences*, vol. 8, no. 2, pp. 171-195.

Hart, P & Saunders, C 1997, 'Power and trust: Critical factors in the adoption and use of electronic data interchange', *Organization Science*, vol. 8, no. 1, p. 19.

Hartwick, J & Barki, H 1994, 'Explaining the role of user participation in information system use', *Management Science,* vol. 40, no. 4, pp. 440-465.

Hatcher, L 1994, *A Step-by-Step Approach to Using the SAS® System for Factor Analysis and Structural Equation Modeling,* SAS Institutte, Inc., Carey, NC.

Hawkins, P, Winter, J & Hunter, J 1995, *Skills for Graduates in the 21st Century*, University of Cambridge, Association of Graduate Recruiters, Cambridge.

Hedges, A 1985, 'Group Interviewing', *Applied Qualitative Research*, ed. R. Walker, Aldershort, Gower.

Heneman, RL, Tansky, JW & Camp, SM 2000, 'Human resource management practices in small and medium-sized enterprises: unanswered questions and future research perspectives', *Entrepreneurship Theory and Practice*, fall, pp. 11-26.

Hill, R & Stewart, J 2000, 'Human resource development in small organizations', *Journal of European Industrial Training*, vol. 24, no. 2-4, p. 12.

Hisrich, RD, Peters, MP, Shepherd, DA & Mombourquette, PS 2006, *Entrepreneurship*, McGraw-Hill Ryerson, Toronto, Canada.

Hornsby, JS & Kuratko, DF 1990, 'Human resource management in small business: critical issues for the 1990's', *Journal of Small Business Management*, July, pp. 9-18.

Houghton, KA & Winklhofer, H 2004, 'The effect of website and e-commerce adoption on the relationship between SMEs and their export intermediaries', *International Small Business Journal*, vol. 22, no. 4, pp. 369-388.

Howlett, M & Ramesh, M 1992, *Political Economy of Canada*, Oxford.

Hudson, M, Bennett, J, Smary, PA & Bourne, M 1999, 'Performance measurement for planning and control in SMEs', in Conference Proceedings in Advances in Production Management Systems, Kluwer Academic Publishers, Berlin, pp. 219-225.

Hudson, M, Bourne, M, Lean, J, Smary, PA 2000, 'Only just managing – no time to measure', in Conference Proceedings Performance Measurement – Past, Present and Future, Cranfield University, Cranfield, pp. 243-250.

Hudson, M, Lean, J & Smart, PA 2001, 'Improving control through effective performance measurement in SMEs', *Production Planning and Control*, vol.12, no. 8, pp. 804-813.

Hughes, A 1997, 'Finance for SMEs: a UK perspective', *Small Business Economics*, vol. 9, pp. 151-166.

Huse, M 1998, 'Researching the dynamics of board-stakeholder relations', *Long Range Planning*, vol. 31, no. 2, pp. 218-226.

Hutcheson, G & Sofroniou, N 1999, *The multivariate social scientist: Introductory statistics using generalized linear models*, Sage Publications, Thousand Oaks, California, USA.

Iacovou, AL, Benbasat, I & Dexter, A 1995, 'Electronic data interchange and small organizations: Adoption and impact of technology', *MIS Quarterly*, December, pp. 465-485.

Igbaria, M, Zinatelli, N, Cragg, P & Cavaye, A 1997, 'Personal computing acceptance factors in small firms: A structural equation model', *MIS Quarterly*, September, pp. 279-303.

Industry Canada 2004, 'Small Business Quarterly', vol. 5, no. 4.

---- 2000, *Electronic Commerce and Technology 2000*, viewed March 28, 2002, <http://e-com.ic.gc.ca/ english/document/ecom_ict_2000.pdf>.

---- 2003, *Key Small Business Statistics*, May.

Innova Quest Inc. 2000, *The State of Electronic Commerce in Atlantic Canada*, prepared for Atlantic Canada Opportunities Agency, March.

'International Benchmarking Study', 2001, *UK Online*.

Jantan, M, Ramayah, T & Chin, WW 2001, 'Personal Computer Acceptance by Small and Medium Sized Companies in Penang: Evidence from Malaysia', *Jurnal Manajemen & Bisnis*, vol. 3, no. 1, pp. 1-14.

Jarvenpaa, SL & Ives, B 1991, 'Executive involvement and participation in the management of information technology', *MIS Quarterly*, vol. 15, no. 2, pp. 205-227.

Jennings, P & Beaver, G 1995 'The performance and competitive advantage of small firms: a management perspective', *International Small Business Journal*, vol. 15, no. 2, pp. 63-75.

Johnson, RA, Hardgrave, BC & Doke, ER 1999, 'An industry analysis of developer beliefs about object-oriented systems development', *DATABASE*, vol. 30, no. 1, p. 17.

Johnston, D, McClean, R & Wade, M, 2004, *Net impact Canada IV: strategies for increasing SME engagement in the e-economy*, publication of the Canadian eBusiness Initiative, September.

Johnston, D, Wade, M & McClean, R 2007, 'Does e-business matter to SMEs?: a comparison of the financial impacts of internet business solutions on European and North American SMEs', *Journal of Small Business Management*, vol. 45, no. 3, pp. 354-361.

Jopko, A, Morgan, D & Archer, N 2001, 'An evaluation of e-commerce support for SMEs in Canada'. Working paper, viewed April 15, 2006, <http://merc.mcmaster.ca/ wpapers/file/sme/sme.html>

Julien, PA & Raymond, L 1994, 'Factors of new technology adoption in the retail sector', *Entrepreneurship: Theory and Practice*, vol. 8, no. 5, pp. 79-90.

Kaiser HF 1974, 'A computational starting point for Rao's canonical factor analysis: implications for computerized procedures', *Educational and Psychological Measurement*, vol. 34, pp. 691-692.

Kalakota, R & Whinston, A 1997, *Electronic Commerce: A Manager's Guide*, Addison-Wesley, Reading, MA.

Kaplan, S & Sawheny, M 2000, 'E-hubs: The new B2B marketplaces', *Harvard Business Review*, vol. 74, no. 3, p. 6.

Keats, BW & Bracker, JS 1988, 'Toward a theory of small firm performance: a conceptual model', *American Journal of Small Business*, vol. 12, pp. 41-58.

Kendall, JE & Kendall, KE 2001, A paradoxically peaceful coexistence between commerce and e-commerce, *Journal of Information Technology Theory and Application*, vol. 3, no. 4, pp. 1-6.

Khazanchi, D 2005, 'Information technology (IT) appropriateness: the contingency theory of "fit" and IT implementation in small and medium enterprises', *Journal of Computer Information Systems*, vol. 45, no. 3, pp. 88-95.

Kimberly, JR & Evanisko, MJ 1981, 'Organizational innovation: The influence of individual, organizational, and contextual factors on hospital adoption of technological and administrative innovations', *Academy of Management Journal*, vol. 24, no. 4, pp. 689-713.

King, WR & He, J 2006 'Understanding the role and methods of meta-analysis in is research', *Communications of the Association for Information Systems*, vol. 16, pp. 665-686.

Kirton, MJ 1976, 'Adaptors and innovators: A description and measure', *Journal of Applied Psychology*, vol. 61, no. 5, p. 7.

Knol, WHC & Stroeken, JHM 2001, 'The diffusion and adoption of information technology in small and medium-sized enterprises through IT scenarios', *Technology Analysis and Strategic Management*, vol. 13, no. 2, pp. 227-246.

Konstadakopulos, D 2006, 'From public loudspeakers to the internet: the adoption of information and communication technologies (ICTs) by small-enterprise clusters in Vietnam', Information *Technologies and International Development*, vol. 2, no. 4, pp. 21-39.

Kotler, P, Armstrong, G & Cunningham, PH 2005, *Principles of Marketing*, 5th Canadian edn., Prentice Hall, Toronto, ON.

Knight, GA & Cavusgil, ST 1997, 'Emerging organizational paradigm for international marketing: the born global firm', *Academy of International Business*, Honolulu, HI.

Kuhn, T 1962, ‘The nature and necessity of scientific revolutions’, in *The Structure of Scientific Revolutions*, University of Chicago Press, Chicago, Ill.

Kuljis, J, Macredie, R & Paul, RJ 1998, 'Information gathering problems in multinational banking', *Journal of Strategic Information Systems*, vol. 7, p. 12.

Lazaridis, IT 2004, ‘Capital budgeting practices: a survey in the firms in Cyprus’, *Journal of Small Business Management*, vol. 42, no. 4, pp. 427-433.

Lederer, AL, Maupin, DJ, Sena, MP & Zhuang, Y 1998, 'The role of ease of use, usefulness and attitude in the prediction of World Wide Web use', paper presented at the 1998 ACM SIGCPR Conference on Computer Personnel Research, Boston, pp. 195-204.

Lee, CS 2001, 'Modeling the business value of information technology', *Information & Management*, vol. 39, p. 19.

Lee, CS 2001, ‘An analytical framework for evaluating e-commerce business models and strategies', *Internet Research: Electronic Network Applications and Policy*, vol. 11, no. 4, pp. 349-359.

Lee, J 2004, ‘Discriminate analysis of technology adoption behavior: a case of internet technologies in small businesses, *Journal of Computer Information Systems*, summer, pp. 57-66.

Lee, J & Runge, J 2001, 'Adoption of information technology for entrepreneurs', *Journal of Computer Information Systems*, vol. 42, no. 1, pp. 44-58.

Lees, JD 1987, 'Successful development of small business information systems', *Journal of Systems Management*, vol. 38, no. 9, p. 7.

Lefebvre, LA, Mason, R & Lefebvre, E 1997, 'The influence prism in SMEs: The power of CEOs’ perceptions on technology policy and its organizational impacts', *Management Science*, vol. 43, no. 6, pp. 856-878.

Levenburg, NM 2005, ‘Does size matter? Small firms’ use of e-business tools in the supply chain,’ *Electronic Markets*, vol. 15, no. 2, pp. 94-105.

Levenburg, NM & Magal, SR 2005, ‘Applying importance-performance analysis to evaluate e-business strategies among small firms,’ *e-Service Journal (Project Muse)*, vol. 3, no. 3, pp. 29-48.

Levenburg, NM, Magal, SR & Kosalge, P 2006, ‘An exploratory investigation of organizational factors and e-business motivations among SMFOEs in the US’, *Electronic Markets*, vol. 16, no. 1, pp. 70-84.

Levy, M & Powell, P 2003, 'Exploring SME internet adoption: towards a contingent model', *Electronic Markets*, vol. 13, no. 2, pp. 173-181.

Lin, F-H & Wu, J-H 2004, ‘An empirical study of end-user computing acceptance factors in small and medium enterprises in Taiwan: analyzed by structural equation modeling’, *Journal of Computer Information Systems*, spring, pp. 98-108.

Lin, CA 1998, 'Exploring personal computer adoption dynamics', *Journal of Broadcasting and Electronic Media*, vol. 42, no. 1, pp. 95-113.

Ling, C 2000, 'Model of Factors Influences on Electronic Commerce Adoption and Diffusion in Small and Medium-Sized Enterprises', Curtin University of Technology.

Lituchy, TR & Rail, A 2000, 'Bed and breakfasts, small inns and the Internet: The impact of technology on the globalization of small businesses', *Journal of International Marketing*, vol. 8, no. 2, pp. 86-97.

Lohrke, FT, Franklin, GM & Frownfelter-Lohrke, C 2006, ‘The Internet as an information conduit: a transaction cost analysis model of US SME Internet use’, *International Small Business Journal*, vol. 24, pp. 159-178.

Looi, HC 2005, ‘E-commerce adoption in Brunei Darussalam: A quantitative analysis of factors influencing its adoption,’ *Communications of the AIS*, vol. 15, pp. 61-81.

Lyles, MA, Baird, IS, Orris, JB and Kuratko, DF 1996, ‘Formalized planning in small business: increasing strategic choices’, *Journal of Small Business Management*, April, pp. 38-50.

Mace, ML 1971, *Directors: Myth and Reality*, Harvard University Press, Boston, MA.

MacGregor, RC, Bunker, DJ & Waugh, P 1998, 'Electronic commerce and small/medium enterprises (SME’s) in Australia: An electronic data interchange (EDI) pilot study', paper presented to the 11th International Bled Electronic Commerce Conference, Slovenia, June.

MacGregor, RC & Vrazalic, L 2004, 'Electronic commerce adoption in small to medium enterprises (SMEs): A comparative study of SMEs in Wollongong (Australia) and Karlstad (Sweden)', University of Wollongong, Wollongong, May.

MacGregor, RC, Vrazalic, L, Bunker, D, Carlsson, S & Magnusson, M 2003, 'The role of enterprise wide business systems in the adoption and use of e-commerce in SMEs: A study of Swedish SMEs', paper presented to the 14th Australasian Conference on Information Systems, Perth, Western Australia, 26-28 November.

Mackenzie, N & Knipe, S 2006, ‘Research dilemmas: paradigms, methods and methodology’, *Issues in Educational Research*, vol. 16, no. 2, pp. 193-205.

Marshall, C & Rossman, G 1989, *Designing Qualitative Research*, Sage Publications Inc., Beverly Hills, CA.

Martin, LM & Matlay, H 2003, 'Innovative use of the Internet in established small firms: The impact of knowledge management and organizational learning in accessing new opportunities', *Qualitative Market Research: An International Journal*, vol. 6, no. 1, pp. 1826-1835.

Mass Mutual Financial Group and the Raymond Institute 2001,

Mathieson, K 1991, 'Predicting userm intentions: Comparing the technology acceptance model with the theory of planned behavior', *Information Systems Research*, vol. 2, no. 3, pp. 173-191.

Mathis, RI & Jackson, JH 1991, *Personnel/Human Resource Management*, 6th edn. West Publishing Company, St.Paul, Minn.

Matlay, J 1999, 'Employee relations in small firms: a micro-business perspective', *Employee Relations*, vol. 21, no. 3, pp. 285-295.

---- 2000, 'Training in the small business sector of the British economy', in S. Carter and D. Jones (ed.), *Enterprise and Small Business: Principles, Policy and Practice*, Addison Wesley, Longman, London.

Matthews, CH & Scott, SG 1995, 'Uncertainty and planning in small and entrepreneurial firms: an empirical assessment', *Journal of Small Business Management*, October, pp. 34-52.

McClean, RJ, Johnston, DA & Wade, M 2003, *Net Impact Study Canada: The International Experience, Interim Report*, publication of the Canadian eBusiness Initiative.

---- 2002, *Net impact study Canada: The SME experience, a preliminary report*, publication of the Canadian eBusiness Initiative.

McCue, S 1998, *Internet: Force or Farce?*, Small Business Development Center, Detroit.

McDaniel, C & Gates, R 1993, *Contemporary Marketing Research*, Thomson Learning, Toronto.

McDonald, J & Wiesner, R 1997, Organizational change and enterprise bargaining in regional SMEs', in Bramble, T., Harley, B., Hall, R. and Whitehouse, G. (eds.), *Current Research in Industrial Relations*, in Proceedings of the 11th AIRAANZ Conference, Brisbane, January 30 – February 1, pp. 485-492.

McEvoy, GM 1984, 'Small business personnel practices', *Journal of Small Business Management*, October, pp. 1-8.

McGregor, J & Gomes, C 1999, 'Technology uptake in small and medium-sized enterprises: Some evidence from New Zealand', *Journal of Small Business Management*, vol. 37, no. 3, pp. 94-103.

McMahon, RGP & Holmes, S 1991, 'Small business financial management practices in North America: a literature review, *Journal of Small Business Management*, April, pp. 19-29.

Mehrtens, J, Cragg, PB & Mills, AM 2001, 'A model of internet adoption by SMEs', *Information & Management*, vol. 39, pp. 165-176.

Mertens, DM 2005, *Research Methods in Education and Psychology: Integrating Diversity with Quantitative and Qualitative Approaches*, 2nd edn., Sage Publications, Thousand Oaks, CA.

Miller, D & Droge, C 1986, 'Traditional and psychological determinants of organization structure', *Admin. Science Quarterly*, vol. 31, pp. 1-25.

Miller, D & Toulouse, JM 1986, 'Chief executive personality and corporate strategy and structure in small firms', *Management Science*, vol. 32, no. 11, pp. 1389-1409.

Mingers, J 2003, 'The paucity of multimethod research: a review of the information systems literature,' *Information Systems Journal*, vol. 13, no. 3, pp. 233-250.

Minichiello, V, Aroni, R, Timewell, G & Alexander, L 1995, *In-depth interviewing principles techniques analysis*, Longman, Melbourne.

Mintzberg, H 1979, *The Structuring of Organizations*, Prentice-Hall, Englewood Cliffs, NJ.

Mirchandani, AA & Motwani, J 2001, 'Understanding small business electronic commerce adoption: An empirical analysis', *Journal of Computer Information Systems*, vol. 41, no. 3, pp. 70-74.

Mohan-Neill, S 2006, 'An analysis of factors which influence small businesses' decision to have a website and to conduct online selling', *Journal of American Academy of Business*, vol. 8, no. 2, pp. 204-209.

Molla, A & Licker, PS 2005, 'Perceived e-readiness factors in e-commerce adoption: An empirical investigation in a developing country', *International Journal of Electronic Commerce*, vol. 10, no. 1, pp. 83-110.

Mombourquette, P 2007, 'What's stopping Atlantic Canadian B&Bs and inns from adopting sophisticated internet business solutions?', paper presented to Atlantic Schools of Business Conference, Wolfville, Nova Scotia, September 28-30.

Monkhouse, E 1995, 'The role of competitive benchmarking in small to medium-sized enterprises', *Benchmarking for Quality Management Technology*, vol. 2, no. 4, pp. 41-50.

Montazemi, AR 1987, 'An analysis of information technology assessment and adoption in small business environments', *INFOR*, vol. 25, no. 4, pp. 327-340.

Moore, GC & Benbasat, I 1991, 'Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation', *Information Systems Research*, vol. 2, no. 3, pp. 192-222.

---- 1993, 'An empirical examination of a model of the factors affecting utilization of information technology by end-users', working paper, University of British Columbia, Faculty of Commerce, November.

Morris, MG & Venkatesh, V 2000, 'Age differences in technology adoption decisions: implications for a changing workforce', *Personnel Psychology*, vol. 53, pp. 375-403.

Morissette, R 1993, 'Canadian jobs and firm size: do smaller firms pay less', *Canadian Journal of Economics*, vol. 26, no. 1, pp. 159-174.

Moser, CA & Kalton, G 1971, *Survey methods in social investigation*, Gower, Aldershot.

Murphy, J 1996, *Small Business Management*, Pitman, London.

Nairn, G 2000, 'Winds of change sweep through the marketplace', *Connectis/ Financial Times*, vol. 4, p. 6.

Napier, HA, Judd, PJ, Rivers, ON & Wagner, SW 2001, *Creating a Winning E-business*, Course Technology, Boston, MA.

Nauwelaers, C & Wintjes, R 2002, 'Innovating SMEs and regions: the need for policy intelligence and interactive policies', *Technology Analysis and Strategic Management*, vol. 14, no. 2, pp. 201-215.

Nickell, GS & Seado, PC 1986, 'The impact of attitudes and experience on small business computer use', *American Journal of Small Business*, spring, pp. 37-48.

Noce, A & Peters, C 2005, 'Barriers to electronic commerce in Canada: a size of firm and industry analysis (III-C), prepared for Industry Canada, pp. 1-25.

Noori, H 1987, 'Benefits arising from new technology adoption: Small vs. large firms', *Journal of Small Business Entrepreneurs*, vol. 5, no. 1, p. 8.

Norušis, MJ 2005, *SPSS 13.0 Advanced Statistical Procedures Companion*, Prentice Hall, London.

O'Brien, P 1998, 'Electronic commerce, the internet and travel cybermediaries', *Australian Journal of Information Systems*, vol. 6, no. 1.

O'Gorman, C & Doran, R 1999, 'Mission statements in small- and medium-sized businesses, *Journal of Small Business Management,* vol. 37, no. 4, pp. 59-66.

O'Leary, Z 2004, *The Essential Guide to Doing Research,* Sage Publications, London.

O'Leary-Kelly, SW & Vokurka, RJ 1998, 'The empirical assessment of construct validity', *Journal of Operations Management,* vol. 16, pp. 387-405.

Oppenheim, AN 1992, *Questionnaire design, interviewing and attitude measurement,* Pinter, London.

O'Sullivan, E & Rassell, G 1989, *Research Methods for Public Administrators,* 1st edn., Longman Inc., New York.

Pallant, J 2001, *SPSS survival manual: a step by step guide to data analysis using SSPS for Windows (Version 10),* Allen & Unwin, Crows Nest, NSW.

Palvia, P, Means, DB & Jackson, WM 1994, 'Determinants of computing in very small businesses, *Information and Management*', vol. 27, pp. 161-174.

Papadaki, E & Chami, B 2002, 'Growth Determinants of Micro-Businesses in Canada', *Small Business Policy Branch,* prepared for Industry Canada, July 17, pp. 1-50.

Patmore, G 1998, 'Digging up the past: historical methods in industrial relations research', in D. Kelly, ed., *Researching industrial relations: methods and methodology,* 2nd edn., Federation Press, Sydney, pp. 213-226.

Patton, M 1990, *Qualitative Evaluation and Research Methods,* 2nd edn, Sage Publications, Newbury Park, CA.

---- 2002, *Qualitative Evaluation and Research Methods*, 3rd edn, Sage Publications, Thousand Oaks, CA.

Peel, MJ & Bridge, J 1998, 'How planning and capital budgeting improve SME performance', *Long Range Planning,* vol. 31, no. 6, pp. 848-856.

Perry, SC 2001, 'The relationship between written business plans and the failure of small businesses in the US', *Journal of Small Business Management,* vol. 39, no. 3, pp. 201-208.

Peterson, RA, Kozmetsky, G & Ridgway, NM 1983, 'Perceived causes of small business failures: a research note', *American Journal of Small Business,* vol. 8, no. 1, pp. 15-19.

Pflughoeft, KA, Ramamurthy, K, Soofi, ES, Yasai-Ardekani, M & Zahedi, FM 2003, 'Multiple conceptualizations of small business web use and benefit', *Decision Sciences*, vol. 34, no. 3, pp. 467-512.

Pissarides, F, Singer, M & Svejnar, J 2000, 'Objectives and constraints of entrepreneurs: evidence from small and medium size enterprises in Russia and Bulgaria', *Journal of Comparative Economics,* vol. 31, no. 3, pp. 503-531.

Plouffe, CR, Hulland, JS & Vandenbosch, M 2001, 'Research report: Richness versus parsimony in modeling technology adoption decisions - Understanding merchant adoption of a smart card-based payment system', *Information Systems Research*, vol. 12, no. 2, pp. 208-222.

Poon, S & Swatman, PM 1997, 'Small business use of the internet: Findings from the Australian case studies', *International Marketing Review*, vol. 14, no. 5, pp. 385-402.

---- 1999, 'An exploratory study of small business internet commerce issues', *Information and Management*, vol. 35, no. 1, pp. 9-19.

Porter, ME 1980, *Competitive Strategy: Techniques for Analyzing Industries and Competitors*, Free Press, New York.

Poulsen, J & French, A 2007, *Discriminant Function Analysis*, viewed December 12, 2007, <http://userwww.sfsu.edu/~efc/classes/biol710/discrim/discrim.pdf>.

Pratt, J 2002, *E-Biz: Strategies for small business success*, US Office of Advocacy, October.

Premkumar, G 2003 'A meta-analysis of research on information technology implementation in small business', *Journal of Organizational Computing & Electronic Commerce,* vol. 13, no. 2, pp. 91-121.

Premkumar, G & Roberts, M 1999, 'Adoption of new information technologies in rural small business', *OMEGA, The International Journal of Management Science*, vol. 27, pp.467-484.

Prescott, MB & Conger, SA 1995, 'Information technology innovations: A classification by IT locus of impact and research approach', *Data Base*, vol. 26, no. 2/3, p. 21.

Proudlock, M, Phelps, B & Gamble, P 1999, 'IT adoption strategies: Best practice guidelines for professional SMEs', *Journal of Small Business and Enterprise Development*, vol. 6, no. 3, pp. 240-252.

Purcell, F 2002, 'Internet and electronic commerce in developing countries of the south pacific: An exploratory study of SMEs in Samoa', prepared for the World Summit of the Information Society, Tokyo, Japan, January 12-15.

Quayle, M 2002, ‘E-commerce: the challenge for UK SMEs in the twenty first century', *International Journal of Operations and Production Management,* vol. 22, no. 10, p. 1148-1161.

Ramayah, T, Siron, R, Dahlan, N & Mohamad, O 2002, 'Technology usage among owners/managers of SMEs: The role of demographic and motivational variables', paper presented to the 6th Annual Asian-Pacific Forum for Small Business, Kuala Lumpur, Malaysia, 16-18 October.

Ramsey, E, Ibbotson, P, Bell, J & McCole, P 2005, ‘Internet-based business among knowledge intensive business services: some Irish regional evidence’, *The Service Industries Journal,* vol. 25, no. 4, pp. 525-545.

Rao, SS, Metts, G & Monge, AM 2003, 'Electronic commerce development in small and medium sized enterprises', *Business Process Management Journal*, vol. 9, no. 1, pp. 11-32.

Raymond, L 2001, 'Determinants of web site implementation in small business', *Internet Research: Electronic network Applications and Policy*, vol. 11, no. 5, p. 11.

Raymond, L, Bergeron, F & Blili, S 2005, ‘The assimilation of e-business in manufacturing SMEs: Determinants and effects on growth and internationalization,’ Electronic Markets, vol. 15, no. 2, pp. 106-118.

Raymond, L, Brisoux, J & Abdellah, A 2001, ‘Marketing information systems practices in small manufacturing firms: antecedents and consequences’, *Journal of Computer Information Systems*, vol. 41, no. 3, pp. 32-41.

Raymond, L & Magnenat-Thalmann, N 1982, ' Information systems in small business: Are they used in managerial decisions', *American Journal of Small Business*, vol. 6, no. 4, p. 3.

Raymond, L, Pare, G & Bergeron, F 1993, 'Information technology and organizational structure revisited: Implications for performance', paper presented to the 14th International Conference on Information Systems, Orlando, Florida.

Reid, G 1992, ‘The state of British enterprise: growth, innovation and competitive advantage in small and medium sized firms’, Small Business Research Centre, University of Cambridge, Cambridge, England, pp. 1-87.

Reid, GC & Smith, JA 2000, 'What makes a new business start-up successful?' *Small Business Economics*, vol. 14, no. 3, p. 17.

Reuber, AR & Fischer, E 1997, 'The influence of the management team’s international experience on the internationalization behaviours of SMEs', *Journal of International Business Studies*, vol. 28, no. 4, p. 18.

Reyment, R & Joreskog, KG 1993, *Applied Factor Analysis in the Natural Sciences*, Cambridge University Press, Cambridge, UK.

Riemenschneider, CK & McKinney, VR 2001-2002, 'Assessing belief differences in small business adopters and non-adopters of web-based e-commerce', *Journal of Computer Information Systems*, winter, pp. 101-107.

Riemenschneider, CK, Harrison, DA & Mykytyn, PP 2003, 'Understanding IT adoption decisions in small business: Integrating current theories', *Information & Management*, vol. 40, pp. 269-285.

Riquelme, H 2002, 'Commercial internet adoption in China: Comparing the experience of small, medium and large business', *Internet Research: Electronic Networking Applications and Policy*, vol. 12, no. 3, p. 10.

Ritchie, R & Brindlely, C 2000, 'Disintermediation, disintegration and risk in the SME global supply chain', *Management Decision*, vol. 38, no. 8, p. 8.

Roberts, M & Wood, M 2002, 'The strategic use of computerized information systems by a micro enterprise', *Logistics Information Management*, vol. 15, no. 2, p. 10.

Robinson, RB, Logan, JE & Salem, MY 1986, 'Strategic versus operational planning in small retail firms', *American Journal of Small Business*, winter, pp. 7-16.

Robinson, RB & Pearce, JA 1983, 'Impact of formalized strategic planning on financial performance in small organizations', *Strategic Management*, vol. 4, no. 3, pp. 128-137.

Robinson , RB & Pearce, JA 1984, 'Research thrusts in small firm strategic planning', *Academy of Management Review*, vol. 9, no. 1, pp. 128-137.

Rogers, EM 1983, *Diffusion of Innovations*, 3rd edn, Free Press, New York.

---- 1995, *Diffusion of Innovations*, 4th edn, Free Press, New York.

Rogers, E & Shoemaker, FF 1971, *Communication of Innovations: A Cross-Cultural Approach*, 2nd edn., Free Press, New York.

Romano, C 1989, 'Research Strategies for Small Business: a Case Study', *International Small Business Journal*, vol. 7, no. 4, pp. 35-43.

Rue, LW & Ibrahim, NA 1998, 'The relationship between planning sophistication and performance in small businesses', *Journal of Small Business Management*, October, pp. 24-32.

Ruth, J-PS 2000, 'So far small biz is only dabbling in e-commerce', *Business News New Jersey*, vol. 13, no. 23, p. 24.

Saloheimo, M 2005, 'ICT and e-business adoption of SMEs in the Rovaniemi region', *Frontiers of E-Business Research*, pp. 58-68.

Saloner, G & Spence, AM 2002, *Creating and Capturing Value, Perspectives and Cases on Electronic Commerce*, Wiley, New York.

Sancosus, M 1995, 'Due processing of laws', CIO, vol. 8, no. 16, pp. 62-70.

Sathye, M & Beal, D 2001, 'Adoption of electronic commerce by SMEs: Australian evidence', *Journal of E-Business*, vol. 1, no. 1, pp. 1-11.

Sawhney, M & Zabin, J 2001, *The seven steps to Nirvana,* McGraw-Hill, New York.

Schmitt, N & Klimoski, RJ 1991, *Research Methods for Human Resource Management,* South Western Publishers.

Schneider, GP & Perry, JT 2000, 'Electronic Commerce', *Cambridge, MA: Course Technology*.

Scott, JA, Dunkelberg, WC & Dennis, WJ 2003, 'Credit, Banks and Small Business: The New Century', *NFIB Research Foundation*, January 2003, viewed March 23, 2004, <www.nfib.com/attach/2427>.

Scupola, A 2002, 'Adoption issues of business-to-business internet commerce in European SMEs', paper presented to the 35th Hawaii International Conference on System Sciences, Hawaii.

SECT 2002, see Survey of Electronic Commerce and Technology 2002

SECT 2003, see Survey of Electronic Commerce and Technology 2003

SECT 2004, see Survey of Electronic Commerce and Technology 2004

SECT 2005, see Survey of Electronic Commerce and Technology 2005

SECT 2006, see Survey of Electronic Commerce and Technology 2006

Sekaran, U 2003, *Research Methods for Business, A Skill Building Approach,* 4th edn., John Wiley & Sons, New York.

Senn, JA 1992, 'Electronic data interchange: the elements of implementation', *Journal of Information Systems Management,* vol. 9, no. 1, pp. 45-53.

Senn, JA & Gibson, VR 1981, 'Risks of investment in microcomputers for small business management', *Journal of Small Business Management,* vol. 19, no. 3, pp. 24-41.

Servais, P, Madsen, TK & Rasmussen, ES 2007, 'Small manufacturing firms' involvement in international e-business activities', *Advances in International Marketing,* no. 17, pp. 297-317.

Sexton, DL & Van Auken, P 1985, 'A longitudinal study of small business strategic planning', *Journal of Small Business Management,* January, pp. 7-15.

Seyal, AH, Awais, MM, Shamail, S & Abbas, A 2004, 'Determinants of electronic commerce in Pakistan: Preliminary evidence from small and medium enterprises', *Electronic Markets*, vol. 14, no. 4, pp. 372-387.

Seyal, AH, Rahim, MM & Rahman, MNA 2000, 'An empirical investigation of use of information technology among small and medium business organizations: a Bruneian scenario', *Electronic Journal of Information Systems in Developing Countries*, vol. 2, no. 7, pp. 1-17.

Sheppard, BH, Hartwick, J & Warshaw, PR 2001 'The theory of reasoned action: a meta-analysis of past research with recommendations for modifications and future research, *Journal of Consumer Research*, vol. 15, pp. 325-343.

ShiftCentral 2003, *Are We Urban? The Urban Growth Agenda in the Atlantic Canadian Context*, prepared for The Greater Halifax Partnership, September 9.

Shutter, J 2006, *Net Impact SME Canada 2006*, Illuminas, Austin, Texas.

Sillince, J, MacDonald, S, Lefang, B & Frost, B 1998, 'Email adoption, diffusion, use and impact with small firms', *International Journal of Information Management*, vol. 18, no. 4, pp. 231-242.

Sincich, T 1995, *Business Statistics by Example*, 5th edn., Prentice-Hall, Upper Saddle River, NJ.

Singuaw, J, Simpson, PM & Enz, CA 2006, 'Conceptualizing innovation orientation: a framework for study and integration of innovation research', *Journal of Product Innovation Management*, vol. 23, pp. 556-574.

Small & Medium-Sized Enterprise Financing in Canada 2003, SME Financing Data Initiative, Industry Canada, viewed February 26, 2007, <http://www.ic.gc.ca/epic/site/sme_fdi-prf_pme.nsf/vwapj/SMEFinancinginCanada_2003Eng.pdf/$FILE/SME FinancinginCanada_2003_Eng.pdf>.

SME FDI 2007 – see *SME Financing Data Initiative*

SME Financing Data Initiative, 2007, Industry Canada, viewed June 1, 2007, <http://www.sme-fdi.gc.ca/epic/site/sme_fdi-prf_pme.nsf/en/Home>.

Smith, AJ, Boocock, G, Loan-Clarke, J & Whittaker, J 1988, 'IIP and SMEs: awareness, benefits and barriers' *Personnel Review*, vol. 31, no. 1, pp. 62-85.

Sparkes, A & Thomas, B 2001, 'The use of the Internet as a critical success factor for the marketing of Welsh agri-food SMEs in the twenty first century', *British Food Journal*, vol. 103, no. 4, pp. 331-347.

Steinfield, C & Whitten, P 1999, 'Community level socio-economic impacts of electronic commerce', *Journal of Computer Mediated Communication*, vol. 5, no. 2, p. 10.

Stevens, J 1996, *Applied Multivariate statistics for the Social Sciences,* Lawrence Erlbaum Associates, Mahwah, NJ.

Stevens, J 2007, *Intermediate Statistics: A Modern Approach,* Lawrence Erlbaum Associates, Mahwah, NJ.

Stonehouse, G & Pemberton, J 2002, 'Strategic planning in SMEs: some empirical findings', *Management Decision,* vol. 40, no. 9, pp. 853-861.

Storey, DJ 1994, *Understanding the small business sector,* Routledge, London.

St-Pierre, J, Beaudoin, R & Desmarais, M 2002, *Financing small- and medium-sized enterprises: satisfaction, access, knowledge and needs*, prepared for Industry Canada, SME Financing Data Initiative.

Stroeken, J 2001, The adoption of IT by SMEs: the Dutch case', Journal of Enterprising Culture, vol.9, no. 1, pp. 129-152.

Study of Canadian Small & Medium-Sized Business Financing 2003, Industry Canada.

The Daily, 2002, Survey of Electronic Commerce and Technology, publication of Statistics Canada, April 12.

Survey of Electronic Commerce and Technology 2002, Statistics Canada

Survey of Electronic Commerce and Technology 2003, Statistics Canada

Survey of Electronic Commerce and Technology 2004, Statistics Canada

Survey of Electronic Commerce and Technology 2005, Statistics Canada

Survey of Electronic Commerce and Technology 2006, Statistics Canada

Survey of Small & Medium-Sized Enterprises in Canada 2003

Sutcliffe, P 1994, 'Information systems innovation among organizations', *Management Science*, vol. 40, no. 9, p. 23.

----1999, 'Interviewing, observation and ethnography: techniques and selection criteria', in D. Kelly, ed., *Researching industrial relations: methods and methodology,* 2nd edn., Federation Press, Sydney, pp. 136-150.

Tabachnick BG & Fidell, LS 2001, *Multivariate Statistics,* 4th edn., Allyn & Bacon, Boston.

Tashakori, M 1980, *Management Succession: From the Owner-Founder to the Professional President,* Praeger, New York.

Taylor, S & Todd, P 1995a, 'Understanding information technology usage: A test of competing models', *Information Systems Research*, vol. 6, no. 2, pp. 144-176.

---- 1995b, 'Assessing IT usage: The role of prior experience', *MIS Quarterly*, vol. 19, no. 4, pp. 561-570.

'Technology and Small Enterprises', 1989, in E Poutsma & AS Walravens (eds), *Technology Autonomy and Industrial Organization*, Delft University Press, Delft, Holland.

Tetteh, E & Burn, J 2001, 'Global strategies for SME-business: Applying the small framework', *Logistics Information Management*, vol. 14, no. 1-2, p. 9.

The Cabinet Office 1999, *e-commerce@its.best.uk*, PaIU.

'The Canadian e-Economy, Country Report', 2003, *Office of the e-Envoy*, July.

The Gallup Organization 2002, viewed August 2002.

The Daily 2002, 'Embracing e-business: Does size matter?', *Statistics Canada*, Thursday, June 6.

'The Rise of Cities in Atlantic Canada', 2006, vol. 40, no. 4.

Thompson, RL, Higgins, CA & Howell, JM 1991, 'Personal computing: Toward a conceptual model of utilization', *MIS Quarterly*, vol. 15, no. 1, p. 8.

Thong, JYL 1999, 'An integrated model of information systems adoption in small business', *Journal of Management Information Systems*, vol. 15, no. 4, p. 27.

Thong, JYL, Yap, CS & Raman, KS 1996, 'Top management support, external expertise and information systems implementation in small businesses', *Information Systems Research*, vol. 7, no. 2, pp. 248-267.

Todtling, F & Kaufman, A 2001, 'The role of the region for innovation activities of SMEs', European Urban and Regional Studies, vol. 8, no. 3, pp. 203-215.

Tornatzky, LG & Klein, KJ 1982, 'Innovation characteristics and innovation adoption, adoption – implementation: a meta-analysis of findings', *IEEE Transactions on Engineering Management*, vol. EM-29, no. 1, pp. 28-43.

Tsoukas, H 1989, 'The validity of idiographic research explanations', *Academy of Management Review*, vol. 14, pp. 551-61.

Tsuja, PY & Nishimura, JS 2002, 'The adoption and implementation of e-commerce by MEs in Peru: A case study approach', paper presented to the First International Conference on Medium Enterprise Development, University of Durham, England.

Tull, DS & Hawkins, DI 1997, *Marketing Research: Measurement and Method*, 4th edn., Macmillan Publishing Company, New York, NY.

Upton, N, Teal, EJ & Felan, JT 2001, 'Strategic and business planning practices of fast growth family firms', *Journal of Small Business Management*, vol. 39, no, 1, pp. 60-72.

USSBA, 2000, *Small Business Expansions in Electronic Commerce*, Office of Advocacy.

Van Akkeren, J & Cavaye, ALM 1999, 'Factors affecting entry-level internet technology adoption by small business in Australia: An empirical study.' paper presented to the Tenth Australasian Conference on Information Systems, Wellington, New Zealand, pp. 1071-1083.

Van Beveren, J & Thomson, H 2002, 'The use of electronic commerce by SMEs in Victoria, Australia', *Journal of Small Business Management*, vol. 40, no. 3, p. 3.

Van Gils, A 2005, 'Management and governance in Dutch SMEs', *European Management Journal*, vol. 23, no. 5, pp. 583-589.

Van Slyke, C 1997, 'The diffusion of technology cluster innovation: The case of the Internet', paper presented to Americas Conference on Information Systems, Indianapolis, 15-17 August.

Veitch, K & Smith, EH 2000, 'The evaluation of customer service performance and the small business – a case study within the packaging supply chain', in Proceedings from the 3rd SMESME International Conference, Coventry University, Coventry, pp. 216-221.

Venkatesh, V & Davis, FD 2000, 'A theoretical extension of the technology acceptance model: four longitudinal field studies', *Management Science*, vol. 46, pp. 186-204.

Venkatesh, V, Morris, MG, Davis, GB & Davis, FD 2003, 'User acceptance of information technology: Toward a unified view', *MIS Quarterly*, vol. 27, no. 3, pp. 425-475.

Venkatesh, V & Speier, C 1999, 'Computer technology training in the workplace: a longitudinal investigation of the effect of mood', *Organizational Behavior and Human Decision Processes*, vol. 79, no. 1, pp. 1-28.

Venkatraman, N 1994, 'IT-enabled business transformation: from automation to business scope redefinition', *Sloan Management Review*, vol. 35, no. 2, pp. 73-87.

Venkatraman, N & Henderson, JC 1998, 'Real strategies for virtual organizing', *Sloan Management Review*, fall, pp. 33-48.

Vescovi, T 2000, 'Internet communication: the Italian SME case', *Corporate Communications: An International Journal*, vol. 5, no. 2, pp. 107-112.

Wager, TH 1998, 'Determinants of human resource management practices in small firms: some evidence from Atlantic Canada', *Journal of Small Business Management,* vol. 36, no.2, pp. 13-23.

Wallace, I 2002, *A Geography of the Canadian Economy,* Oxford University Press, Don Mills, Ontario.

Warshaw, PR 1980, 'A new model for predicting behavioral intentions: an alternative to Fishbein', *Journal of Marketing Research,* vol. 17, no. 2, pp. 153-172.

Welsh, JA & White, JF 1981, 'A small business is not a little big business', *Harvard Business Review*, vol. 59, no. 4, pp. 18-32.

Westhead, P & Storey, DJ 1996, 'Management training and small firm performance: Why is the link so weak?' *International Small Business Journal*, vol. 14, no. 4, p. 11.

Whitaker, JS 1997, 'Use of stepwise methodology in discriminant analysis', paper presented at the Annual Meeting of the Southwest Educational Research Association, Austin, TX, January 23-25.

White, MD, Abels, EG & Gordon-Murnane, L 1998, 'What constitutes adoption of the web: A methodological problem in assessing adoption of the world wide web for electronic commerce', *Journal of the American Society for Information Science*, vol. 35, p. 9.

Wymer, S & Regan, E 2005, 'Factors influencing e-commerce adoption and use by small and medium businesses', *Electronic Markets,* vol. 15, no. 4, pp. 438-453.

Willcocks, L, Sauer, C & Associates 2000, *Moving to e-Business,* Random House.

Winston, ER & Dologite, D 2002, 'How does attitude impact IT implementation: A study of small business owners', *Journal of End User Computing*, vol. 14, no. 2, pp. 16-29.

Wise, R & Morrison, D 2000, 'Beyond the exchange: The future of B2B', *Harvard Business Review*, vol. 74, no. 6, p. 10.

Woods, A & Joyce, P 2003, 'Owner-managers and the practice of strategic management', *International Small Business Journal,* vol. 21, no. 2, pp. 181-195.

Worren, N, Morre, K & Carmona, P 2002, 'Modularity, strategy flexibility, and firm performance: a study of the home appliance industry', *Strategic Management Journal*, vol. 23, no. 12, pp. 1123-1140.

Wu, F, Mahajan, V & Balasubramanian, S 2003, 'An analysis of e-business adoption and its impact on business performance', *Journal of the Academy of Marketing Science*, vol. 31, no. 4, pp. 425-447.

Wulder, M 2007, 'Discriminant Analysis', published by Natural Resources Canada, viewed February 6, 2006, <http://www.scf.rncan.gc.ca/subsite/wulder/discriminant>.

Wymer, S & Regan E 2005, 'Factors influencing e-commerce adoption and use by small and medium businesses', *Electronic Markets*, vol. 15, no. 4, p. 15.

Yap, C 1989a, 'Computerization problems facing small and medium enterprises: The experience of Singapore', paper presented to the 20th Annual Meeting of the Midwest Decision Sciences Institute, Miami University, Miami, 19-21 April.

Yap, CS 1989b, 'Issues in managing information technology', *Journal Oper. Res. Society*, vol. 40, no. 7, p. 9.

Yap, CS, Soh, CPP & Raman, KS 1992, 'Information system success factors in small business', *International Journal of Management Science*, vol. 20.

Yap, CS, Thong, L & Raman, KS 1994, 'Effect of government incentives on computerization in small business', *European Journal of Information Systems*, vol. 3, no. 3, p. 15.

Yetton, PW, Johnston, K & Craig, J 1994, 'Computer-aided architects: a case study of IT and strategic change, *Sloan Management Review*, summer, pp. 57-67.

Yin, RK 1994, *Case Study Research: Design and Methods*, 2nd edn, Sage Publications, Thousand Oaks, CA.

Zhu, K, Kraemer, KL & Xu, S 2002, 'A cross-country study of electronic business adoption using the technology-organization-environment framework', paper presented to the Twenty-Third International Conference on Information Systems, December.

Zikmund, W 2003, *Business Research Methods*, 7th edn. Thomson, South Western, Mason, OH.

Zwass, V 1994 'Electronic commerce: structures and issues', *International Journal of Electronic Commerce*, vol. 1, no. 1, pp. 3-23.

---- 1997, *Foundations of Information Systems*, McGraw-Hill, New York.

APPENDIX A: CASE STUDY INTERVIEW

1. Describe your company's current use of e-commerce.

2. Does your company make use of any of the following e-commerce technologies?

1) E-Mail. 1) Yes 2) No 3) With whom? 4) Why or why not?
2) Browsing the web. 1) Yes 2) No 3) With whom? 4) Why or why not?
3) External access to secure files 1) Yes 2) No 3) Who has access? 4) Why or why not?
3) Making purchases through the Internet via telephone or e-mail. 1) Yes 2) No 4) Why or why not?
4) Making purchases completely online including the placing of the order and payment. 1) Yes 2) No 3) Why or why not?
9) Selling goods through the Internet by allowing customers to phone or e-mail in orders. 1) Yes 2) No 3) Why or why not?
10) Completing full transactions using the Internet including order acceptance and processing payment. 1) Yes 2) No 3) Why or why not?
11) Electronic Data Exchange (EDI) 1) Yes 2) No 3) Why or why not?
12) Participating in online auctions. 1) Yes 2) No 3) Why or why not?

3. Does your company have a website?
   a) Yes
   b) No (Go to Q.5)

4. I am going to read you a list of website features. Please indicate to me whether or not your website has any of these features. Feel free to comment on the use of the features, the extent of use and why you have or have not adopted such functions.

1) Provide product information?	1) Yes 2) No
2) Provide contact information for the company?	1) Yes 2) No
3) Maps or detailed directions to the company?	1) Yes 2) No
3) Provide answers to frequently asked questions (FAQ)?	1) Yes 2) No
4) Allow web site visitors to directly email the company questions from the web site?	1) Yes 2) No
5) Allow customers to use the telephone or an email address to place an order from your website?	1) Yes 2) No
6) Allow customers to purchase products directly from the website using a credit card or Electronic Data Exchange (EDI)?	1) Yes 2) No
7) Track customers current and past purchases?	1) Yes 2) No
8) Calculate shipping costs?	1) Yes 2) No
9) Track shipping time of a product?	1) Yes 2) No
10) Make recommendations for customer purchases?	1) Yes 2) No
11) Allow customers to post reviews of company products?	1) Yes 2) No
12) Provide a bulletin board for customers to post comments on products, your company, etc?	1) Yes 2) No
13) Have online chat?	1) Yes 2) No
14) Make use of interactive sites or multi media such as web videos, product demonstrations, etc?	1) Yes 2) No
15) Allow prospective employees to see job opportunities with your company?	1) Yes 2) No
16) Provide current employees with information on company human resource policies and or information?	1) Yes 2) No
17) Provide employees with external access (information such as data bases, contracts and such)?	1) Yes 2) No

5. Please summarize the degree of use of e-commerce technology in your firm.

6. Describe your firm's e-commerce adoption process.

7. What is keeping you from adopting more sophisticated e-commerce technologies?

8. What has motivated your firm to adopt its current e-commerce technologies?

9. What would motivate your firm to enhance your current level of e-commerce adoption?

10. What barriers have prevented your firm from adopting more sophisticated e-commerce technologies?

11. Who makes important managerial decisions in your firm?

12. Describe your firm's decision making process.

13. On a scale of 0-100%, how much do you influence your company's decision to adopt e-commerce? _____ %

14. This is the proposed quantitative survey that will be used in the full research study. Can you fill it out and comment on the following:

1. Understanding: Understand the terms used? Understand the survey?
2. Interesting: Did you find the survey interesting?
3. Sequence: Does the sequencing make sense?
3. Length: Is the survey appropriate in length?

Pilot Survey

1. I am going to read a list of e-commerce transactions. I want you to indicate which e-commerce transactions your business is currently engaged in. (Note: Answer Column A, then answer Column B for all transactions with a "yes" answer in Column A)

A) E-Commerce Transactions	**B) Frequency** (How often do you _____ [eg: email within the company]? extremely frequently (7) quite frequently (6) slightly frequently (5) neither frequently nor infrequently (4) slightly infrequently (3) quite infrequently (2) extremely infrequently (1)
1) E-Mail within the company. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
2) E-mail with	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____

customers. 1) Yes 2) No	extremely quite slightly neither slightly quite extremely
3) E-mail with suppliers. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
4) Browsing the web for information on customers. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
5) Browsing the web for information on suppliers. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
6) Browsing the web for information on competitors. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
7) Making purchases through the Internet via telephone or e-mail. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
8) Making purchases completely online including the placing of the order and payment. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
9) Selling goods through the Internet by allowing customers to phone or e-mail in orders. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
10) Completing full transactions using the Internet including order acceptance and processing payment. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
11) Electronic Data Exchange (EDI) 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely

12) Participating in online auctions. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely

2. Does your company have a website?
   a) Yes
   b) No (Go to Q.4)

3. I am going to read you a list of website features. Please indicate to me whether or not your website has any of these features.

1) Provide product information including pictures and descriptions?	1) Yes 2) No
2) Provide contact information for the company for example phone number, address, email address?	1) Yes 2) No
3) Provide answers to frequently asked questions (FAQ)?	1) Yes 2) No
4) Allow web site visitors to directly email the company questions from the web site?	1) Yes 2) No
5) Allow customers to use the telephone or an email address to place an order from your website?	1) Yes 2) No
6) Allow customers to purchase products directly from the website using a credit card or Electronic Data Exchange (EDI)?	1) Yes 2) No
7) Track customers current and past purchases?	1) Yes 2) No
8) Calculate shipping costs?	1) Yes 2) No
9) Track shipping time of a product?	1) Yes 2) No
10) Make recommendations for customer purchases?	1) Yes 2) No
11) Allow customers to post reviews of company products?	1) Yes 2) No
12) Provide a bulletin board for customers to post comments on products, your company, etc?	1) Yes 2) No
13) Have online chat?	1) Yes 2) No
14) Make use of multi media such as web videos, product demonstrations, etc?	1) Yes 2) No

4. Please indicate which of the following levels best describes the degree of use of e-commerce technology in your firm? (Circle level chosen)

   Level 1 – No use of e-commerce technology
   Level 2 – Using basic web browsing and e-mail.
   Level 3 – Maintaining a website for promotional purposes, engaging in e-mail and Internet browsing.

Level 4 – Taking orders via the website and/or making online purchases.
Level 5 – Completing online purchasing and selling transaction, making and accepting online payments.
Level 6 – Completing all transactions on the Internet; using an interactive web site, and a personalized web pages for suppliers and buyers.

5. If you did not answer Level 6 to the previous question (may have to remind the respondent that Level 6 is the highest level) what is keeping you from adopting more sophisticated e-commerce technologies.

Note: For the following questions use the level circled above as the existing level of use of e-commerce technology, and use the next level as the key to each question.

I am going to read you a list of questions about considering adopting e-commerce technology, or a more sophisticated level of e-commerce technology, than your company currently uses. Please respond by indicating to me how likely you would use the level of e-commerce technology in the firm, using the following scale:

- extremely likely (7)
- quite likely (6)
- slightly likely (5)
- neither likely nor unlikely (4)
- slightly unlikely (3)
- quite unlikely (2)
- extremely unlikely (1)

Note: Read the level description out loud for the next level for the following questions. If there is confusion, also remind them about their current level of adoption based on the answer to Q4.

<u>Performance expectancy</u>

6. I would find using the next Level (describe) ____ of e-commerce technology useful for my staff and I.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

7. Using the next Level (describe) ____ of e-commerce technology would enable my staff and I to accomplish tasks more quickly.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

8. Using the next Level (describe) ____ of e-commerce technology would increase productivity of my staff and me.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

9. If my staff and I use the next Level (describe) ____ of e-commerce technology, it will increase the profitability of the company.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

Effort expectancy

10. Our interaction with the next Level (describe) ____of e-commerce technology will be clear and understandable.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

11. It would be easy for my staff and I to become skillful at using the next Level (describe) ____ of e-commerce technology.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

12. My staff and I would find using the next Level (describe) ____ of e-commerce technology easy to use.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

13. Learning to operate the next Level (describe) ____ of e-commerce technology would be easy for my staff and I.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

Social Influence

14. People who influence me think that my staff and I should use the next Level (describe)___of e-commerce technology.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

15. People who are important to me think that my staff and I should use the next Level (describe)____of e-commerce technology.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

16. My staff and I would be supported by other senior managers of this business in the use of the next Level (describe) ____of e-commerce technology.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

17. In general, the organization will support the use of the next Level (describe) ____of e-commerce technology.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

CEO Innovation

I am going to read some statements about your use of technology. For each statement please indicate whether you would be:

- extremely likely (7)
- quite likely (6)
- slightly likely (5)
- neither likely nor unlikely (4)
- slightly unlikely (3)
- quite unlikely (2)
- extremely unlikely (1)

to do what the statement refers to regarding the use of technology.

18. If I heard about a new technology, I would look for ways to experiment with it .

UNLIKELY ___1___|__2__|___3___|___4___|___5___|__6__|__7__ LIKELY
Extremely quite slightly neither slightly quite extremely

19. Among my peers I am usually the first to try out new technologies.

UNLIKELY ___1___|__2__|___3___|___4___|___5___|__6__|__7__ LIKELY
Extremely quite slightly neither slightly quite extremely

20. In general, I am hesitant to try out new technologies.
(note reverse scale values)

UNLIKELY ___7___|__6__|___5___|___4___|___3___|__2___|___1___ LIKELY
Extremely quite slightly neither slightly quite extremely

21. I like to experiment with new technologies.

UNLIKELY ___1___|__2__|___3___|___4___|___5___|__6__|__7__ LIKELY
Extremely quite slightly neither slightly quite extremely

CEO Knowledge

I am going to read some statements about your understanding of e-commerce technology. For each statement please indicate whether your understanding is:

- extremely high (7)
- quite high (6)
- slightly high (5)
- neither high nor low (4)
- slightly low (3)
- quite low (2)
- extremely low (1)

22. My understanding of e-commerce technology compared with my peers is:

LOW ___1___|___2___|___3___|___4___|___5___|___6___|___7___ HIGH
extremely quite slightly neither slightly quite extremely

23. I feel that my knowledge of e-commerce technology is:

LOW ___|_____|_____|_____|_____|_____|_____|_____ HIGH
extremely quite slightly neither slightly quite extremely

Employee's Knowledge

I am going to read some statements about your employees' knowledge of e-commerce technology. Please tell me whether you:

- Strongly agree (5)
- Agree somewhat (4)
- Neither agree nor disagree (3)
- Disagree somewhat (2)
- Strongly disagree (1)

…with each of the following statements.

24. My employees are all computer literate.

DISAGREE___1___|___2___|___3___|___4___|___5___ AGREE
Strongly somewhat neither somewhat Strongly

25. There is at least one employee who is a computer expert.

DISAGREE___1___|___2___|___3___|___4___|___5___ AGREE
Strongly somewhat neither somewhat Strongly

26. I would rate my employees' understanding of computers as very good compared with other small companies in the same industry.

DISAGREE___1___|___2___|___3___|___4___|___5___ AGREE
Strongly somewhat neither somewhat Strongly

Behavioural intention to use the system

27. My staff and I *intend* to use the next Level (describe) ____ in the next 6 months.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

28. I *predict* that my staff and I would use the system (the next level – describe) in the next 6 months.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

29. My staff and I *plan* to use the next Level (describe) ____ in the next 6 months.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

30. On a scale of 0-100%, how much do you influence your company's decision to adopt e-commerce? _____ %

Demographics

Now I am going to ask you some questions about your company, and your involvement with the company.

31. Your company is located in which Atlantic Canadian Province _____.

32. What best describes the category of business the firm operates in?
1) Manufacturing
2) Services
3) Finance
4) Communications
5) Advertising
6) Retail
7) Oil & Gas
8) Tourism
9) Not for profit
10) Other (specify): _____

33. What is the age of the firm in years?
1) Less than one year
2) 1 – 3 years
3) 4 – 7 years
4) 8 – 10 years
5) More than 10 years

34. How many full and part time employees does the firm employ?

1) Less then 5
2) 6 – 10
3) 11 – 20
4) 21 – 50
5) 51 – 99
6) 100 – 150
7) 151 – 200
8) More than 200

35. What best describes your position with the company ?

1) Owner/CEO
2) IT Manager
3) Other Manager (please specify) _____
4) Other (please specify) _____

36. How many years have you been at this current position?

1) Less than 1 year
2) 1 – 3 years
3) 4 – 7 years
4) 8 – 10 years
5) 10 years +_____

37. Indicate gender of respondent: a) Male b) Female

38. What is the highest level of education you have completed?

1) Some high school
2) High School
3) Some Community College
4) Community College
5) Some University
6) University Degree
7) Master's
8) Doctorate
9) Other (please specify) _____

39. I am going to read a list of age ranges. Please indicate which range contains your age:

1) Under 25
2) 25 to 34
3) 35 to 44
4) 45 to 54
5) 55 to 64
6) 65 and over

APPENDIX B: PILOT SURVEY

1. I am going to read a list of e-commerce transactions. I want you to indicate which e-commerce transactions your business is currently engaged in. (Note: Answer Column A, then answer Column B for all transactions with a "yes" answer in Column A)

A) E-Commerce Transactions	**B) Frequency** (How often do you _____ [eg: email within the company]? extremely frequently (7) quite frequently (6) slightly frequently (5) neither frequently nor infrequently (4) slightly infrequently (3) quite infrequently (2) extremely infrequently (1)
1) E-Mail within the company. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
2) E-mail with customers. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
3) E-mail with suppliers. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
4) Browsing the web for information on customers. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
5) Browsing the web for information on suppliers. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
6) Browsing the web for information on competitors. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
7) Making purchases through the Internet via telephone or e-mail. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
8) Making purchases completely online	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____

including the placing of the order and payment. 1) Yes 2) No	extremely quite slightly neither slightly quite extremely
9) Selling goods through the Internet by allowing customers to phone or e-mail in orders. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
10) Completing full transactions using the Internet including order acceptance and processing payment. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
11) Electronic Data Exchange (EDI) 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
12) Participating in online auctions. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely

2. Does your company have a website?
   a) Yes
   b) No (Go to Q.4)

3. I am going to read you a list of website features. Please indicate to me whether or not your website has any of these features.

1) Provide product information including pictures and descriptions?	1) Yes 2) No
2) Provide contact information for the company for example phone number, address, email address?	1) Yes 2) No
3) Provide answers to frequently asked questions (FAQ)?	1) Yes 2) No
4) Allow web site visitors to directly email the company questions from the web site?	1) Yes 2) No
5) Allow customers to use the telephone or an email address to place an order from your website?	1) Yes 2) No
6) Allow customers to purchase products directly from the website using a credit card or Electronic Data Exchange (EDI)?	1) Yes 2) No

7) Track customers current and past purchases?	1) Yes 2) No
8) Calculate shipping costs?	1) Yes 2) No
9) Track shipping time of a product?	1) Yes 2) No
10) Make recommendations for customer purchases?	1) Yes 2) No
11) Allow customers to post reviews of company products?	1) Yes 2) No
12) Provide a bulletin board for customers to post comments on products, your company, etc?	1) Yes 2) No
13) Have online chat?	1) Yes 2) No
14) Make use of multi media such as web videos, product demonstrations, etc?	1) Yes 2) No

4. Please indicate which of the following levels best describes the degree of use of e-commerce technology in your firm? (Circle level chosen)

Level 1 – No use of e-commerce technology
Level 2 – Using basic web browsing and e-mail.
Level 3 – Maintaining a website for promotional purposes, engaging in e-mail and Internet browsing.
Level 4 – Taking orders via the website and/or making online purchases.
Level 5 – Completing online purchasing and selling transaction, making and accepting online payments.
Level 6 – Completing all transactions on the Internet; using an interactive web site, and a personalized web pages for suppliers and buyers.

5. If you did not answer Level 6 to the previous question (may have to remind the respondent that Level 6 is the highest level) what is keeping you from adopting more sophisticated e-commerce technologies.

Note: For the following questions use the level circled above as the existing level of use of e-commerce technology, and use the next level as the key to each question.

I am going to read you a list of questions about considering adopting e-commerce technology, or a more sophisticated level of e-commerce technology, than your company currently uses. Please respond by indicating to me how likely you would use the level of e-commerce technology in the firm, using the following scale:

- extremely likely (7)
- quite likely (6)
- slightly likely (5)
- neither likely nor unlikely (4)
- slightly unlikely (3)
- quite unlikely (2)
- extremely unlikely (1)

Note: Read the level description out loud for the next level for the following questions. If there is confusion, also remind them about their current level of adoption based on the answer to Q4.

Performance expectancy

6. I would find using the next Level (describe) ____ of e-commerce technology useful for my staff and I.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

7. Using the next Level (describe) ____ of e-commerce technology would enable my staff and I to accomplish tasks more quickly.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

8. Using the next Level (describe) ____ of e-commerce technology would increase productivity of my staff and me.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

9. If my staff and I use the next Level (describe) ____ of e-commerce technology, it will increase the profitability of the company.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

Effort expectancy

10. Our interaction with the next Level (describe) ____of e-commerce technology will be clear and understandable.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

11. It would be easy for my staff and I to become skillful at using the next Level (describe) ____ of e-commerce technology.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

12. My staff and I would find using the next Level (describe) ____ of e-commerce technology easy to use.

UNLIKELY LIKELY

___1___|__2__|___3___|__4___|___5___|__6___|___7____

extremely quite slightly neither slightly quite extremely

13. Learning to operate the next Level (describe) ____ of e-commerce technology would be easy for my staff and I.

UNLIKELY LIKELY

___1___|__2__|___3___|__4___|___5___|__6___|___7____

extremely quite slightly neither slightly quite extremely

Social Influence

14. People who influence me think that my staff and I should use the next Level (describe)___of e-commerce technology.

UNLIKELY LIKELY

___1___|__2__|___3___|__4___|___5___|__6___|___7____

extremely quite slightly neither slightly quite extremely

15. People who are important to me think that my staff and I should use the next Level (describe)____of e-commerce technology.

UNLIKELY LIKELY

___1___|__2__|___3___|__4___|___5___|__6___|___7____

extremely quite slightly neither slightly quite extremely

16. My staff and I would be supported by other senior managers of this business in the use of the next Level (describe) ____of e-commerce technology.

UNLIKELY LIKELY

___1___|__2__|___3___|__4___|___5___|__6___|___7____

extremely quite slightly neither slightly quite extremely

17. In general, the organization will support the use of the next Level (describe) ____of e-commerce technology.

UNLIKELY LIKELY

___1___|__2__|___3___|__4___|___5___|__6___|___7____

extremely quite slightly neither slightly quite extremely

CEO Innovation

I am going to read some statements about your use of technology. For each statement please indicate whether you would be:

- extremely likely (7)
- quite likely (6)

- slightly likely (5)
- neither likely nor unlikely (4)
- slightly unlikely (3)
- quite unlikely (2)
- extremely unlikely (1)

to do what the statement refers to regarding the use of technology.

18. If I heard about a new technology, I would look for ways to experiment with it .

UNLIKELY ___1___|__2__|___3__|___4__|___5__|__6__|__7__ LIKELY
Extremely quite slightly neither slightly quite extremely

19. Among my peers I am usually the first to try out new technologies.

UNLIKELY ___1___|__2__|___3__|___4__|___5__|__6__|__7__ LIKELY
Extremely quite slightly neither slightly quite extremely

20. In general, I am hesitant to try out new technologies.
(note reverse scale values)

UNLIKELY ___7___|__6__|___5___|__4___|___3___|__2___|___1___ LIKELY
Extremely quite slightly neither slightly quite extremely

21. I like to experiment with new technologies.

UNLIKELY ___1___|__2__|___3__|___4__|___5__|__6__|__7__ LIKELY
Extremely quite slightly neither slightly quite extremely

CEO Knowledge

I am going to read some statements about your understanding of e-commerce technology. For each statement please indicate whether your understanding is:

- extremely high (7)
- quite high (6)
- slightly high (5)
- neither high nor low (4)
- slightly low (3)
- quite low (2)
- extremely low (1)

22. My understanding of e-commerce technology compared with my peers is:

LOW ___1__|__2_|___3__|___4__|___5__|__6__|___7___ HIGH
extremely quite slightly neither slightly quite extremely

23. I feel that my knowledge of e-commerce technology is:

LOW ___|_____|_____|_____|_____|_____|_____|_____ HIGH
extremely quite slightly neither slightly quite extremely

Employee Knowledge

I am going to read some statements about your employees' knowledge of e-commerce technology. Please tell me whether you:

- Strongly agree (5)
- Agree somewhat (4)
- Neither agree nor disagree (3)
- Disagree somewhat (2)
- Strongly disagree (1)

…with each of the following statements.

24. My employees are all computer literate.

DISAGREE___1___|___2___|___3___|___4___|___5___ AGREE
Strongly somewhat neither somewhat Strongly

25. There is at least one employee who is a computer expert.

DISAGREE___1___|___2___|___3___|___4___|___5___ AGREE
Strongly somewhat neither somewhat Strongly

26. I would rate my employees' understanding of computers as very good compared with other small companies in the same industry.

DISAGREE___1___|___2___|___3___|___4___|___5___ AGREE
Strongly somewhat neither somewhat Strongly

Behavioural intention to use the system

27. My staff and I *intend* to use the next Level (describe) ____ in the next 6 months.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

28. I *predict* that my staff and I would use the system (the next level – describe) in the next 6 months.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

29. My staff and I *plan* to use the next Level (describe) ____ in the next 6 months.

UNLIKELY LIKELY

___1___|__2__|___3___|__4___|___5___|__6___|___7____

extremely quite slightly neither slightly quite extremely

30. On a scale of 0-100%, how much do you influence your company's decision to adopt e-commerce? _____ %

Demographics

Now I am going to ask you some questions about your company, and your involvement with the company.

31. Your company is located in which Atlantic Canadian Province _____.

32. What best describes the category of business the firm operates in?

1) Manufacturing
2) Services
3) Finance
4) Communications
5) Advertising
6) Retail
7) Oil & Gas
8) Tourism
9) Not for profit
10) Other (specify): _____

33. What is the age of the firm in years?

1) Less than one year
2) 1 – 3 years
3) 4 – 7 years
4) 8 – 10 years
5) More than 10 years

34. How many full and part time employees does the firm employ?

1) Less then 5
2) 6 – 10
3) 11 – 20
4) 21 – 50
5) 51 – 99
6) 100 – 150
7) 151 – 200
8) More than 200

35. What best describes your position with the company ?

1) Owner/CEO
2) IT Manager
3) Other Manager (please specify) _____
4) Other (please specify) _____

36. How many years have you been at this current position?

1) Less than 1 year
2) 1 – 3 years
3) 4 – 7 years
4) 8 – 10 years
5) 10 years +_____

37. Indicate gender of respondent: a) Male b) Female

38. What is the highest level of education you have completed?

1) Some high school
2) High School
3) Some Community College
4) Community College
5) Some University
6) University Degree
7) Master's
8) Doctorate
9) Other (please specify) _____

39. I am going to read a list of age ranges. Please indicate which range contains your age:

1) Under 25
2) 25 to 34
3) 35 to 44
4) 45 to 54
5) 55 to 64
6) 65 and over

That concludes our survey. Thank you for your help.

APPENDIX C: FINAL SURVEY

1. I am going to read a list of e-commerce transactions. I want you to indicate which e-commerce transactions your business is currently engaged in. (Note: Answer Column A, then answer Column B for all transactions with a "yes" answer in Column A)

A) E-Commerce Transactions	**B) Frequency** (How often do you _____ [eg: email within the company]? extremely frequently (7) quite frequently (6) slightly frequently (5) neither frequently nor infrequently (4) slightly infrequently (3) quite infrequently (2) extremely infrequently (1)
1) E-Mail within the company. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
2) E-mail with customers. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
3) E-mail with suppliers. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
4) Browsing the web for information on competitors. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
5) Browsing the web for information on customers. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
6) Browsing the web for information on suppliers. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
7) Making purchases through the Internet via telephone or e-mail. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
8) Making purchases completely online including the placing	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely

of the order and payment. 1) Yes 2) No	
9) Electronic Data Exchange (EDI) 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
10) Selling goods through the Internet by allowing customers to phone or e-mail in orders. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
11) Completing full transactions using the Internet including order acceptance and processing payment. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely
12) Participating in online auctions. 1) Yes 2) No	INFREQUENTLY FREQUENTLY ___1___|__2__|___3___|__4___|___5___|__6___|___7____ extremely quite slightly neither slightly quite extremely

2. Does your company have a website?
   a) Yes
   b) No (Go to Q.4)

3. I am going to read you a list of website features. Please indicate to me whether or not your website has any of these features.

1) Provide product information including pictures and descriptions?	1) Yes 2) No
2) Provide contact information for the company for example phone number, address, email address?	1) Yes 2) No
3) Provide answers to frequently asked questions (FAQ)?	1) Yes 2) No
4) Allow web site visitors to directly email the company questions from the web site?	1) Yes 2) No
5) Allow customers to use the telephone or an email address to place an order from your website?	1) Yes 2) No
6) Allow customers to purchase products directly from the website using a credit card or Electronic Data Exchange (EDI)?	1) Yes 2) No
7) Track customers current and past	1) Yes 2) No

purchases?	
8) Calculate shipping costs?	1) Yes 2) No
9) Track shipping time of a product?	1) Yes 2) No
10) Make recommendations for customer purchases?	1) Yes 2) No
11) Allow customers to post reviews of company products?	1) Yes 2) No
12) Provide a bulletin board for customers to post comments on products, your company, etc?	1) Yes 2) No
13) Have online chat?	1) Yes 2) No
14) Make use of multi media such as web videos, product demonstrations, etc?	1) Yes 2) No

4. Please indicate which of the following levels best describes the degree of use of e-commerce in your firm? (Circle level chosen)

Level 1 – No use of e-commerce technology
Level 2 – Using basic web browsing and e-mail.
Level 3 – Maintaining a website for promotional purposes, engaging in e-mail and Internet browsing.
Level 4 – Taking orders via the website and/or making online purchases.
Level 5 – Completing online purchasing and selling transaction, making and accepting online payments.
Level 6 – Completing all transactions on the Internet; using an interactive web site, and a personalized web pages for suppliers and buyers.

Note: For the following questions use the level circled above as the existing level of use of e-commerce technology, and use the next level as the key to each question.

I am going to read you a list of questions about considering adopting e-commerce technology, or a more sophisticated level of e-commerce technology, than your company currently uses. Please respond by indicating to me how likely you would use the level of e-commerce technology in the firm, using the following scale:

- extremely likely (7)
- quite likely (6)
- slightly likely (5)
- neither likely nor unlikely (4)
- slightly unlikely (3)
- quite unlikely (2)
- extremely unlikely (1)

Note: Read the level description out loud for the next level for the following questions. If there is confusion, also remind them about their current level of adoption based on the answer to Q4.

Performance expectancy

5. I would find using the next level Level (describe) ____ of e-commerce technology useful for my staff and I.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

6. Using the next level Level (describe) ____ of e-commerce technology would enable my staff and I to accomplish tasks more quickly.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

7. Using the next level Level (describe) ____ of e-commerce technology would increase productivity of my staff and me.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

8. If my staff and I use the next level Level (describe) ____ of e-commerce technology, it will increase the profitability of the company.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

Effort expectancy

9. Our interaction with the next level Level (describe) ____of e-commerce technology will be clear and understandable.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

10. It would be easy for my staff and I to become skillful at using the next level Level (describe) ____ of e-commerce technology.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

11. My staff and I would find using the next level Level (describe) ____ of e-commerce technology easy to use.

UNLIKELY LIKELY

___1___|__2__|___3___|__4___|___5___|__6___|___7____

extremely quite slightly neither slightly quite extremely

12. Learning to operate the next level Level (describe) ____ of e-commerce technology would be easy for my staff and I.

UNLIKELY LIKELY

___1___|__2__|___3___|__4___|___5___|__6___|___7____

extremely quite slightly neither slightly quite extremely

Social Influence

13. People who influence me think that my staff and I should use the next level Level (describe)___of e-commerce technology.

UNLIKELY LIKELY

___1___|__2__|___3___|__4___|___5___|__6___|___7____

extremely quite slightly neither slightly quite extremely

14. People who are important to me think that my staff and I should use the next level Level (describe)____of e-commerce technology.

UNLIKELY LIKELY

___1___|__2__|___3___|__4___|___5___|__6___|___7____

extremely quite slightly neither slightly quite extremely

15. My staff and I would be supported by other senior managers of this business in the use of the next level Level (describe) ____of e-commerce technology.

UNLIKELY LIKELY

___1___|__2__|___3___|__4___|___5___|__6___|___7____

extremely quite slightly neither slightly quite extremely

16. In general, the organization will support the use of the next level Level (describe) ____of e-commerce technology.

UNLIKELY LIKELY

___1___|__2__|___3___|__4___|___5___|__6___|___7____

extremely quite slightly neither slightly quite extremely

CEO Innovation

I am going to read some statements about your use of technology. For each statement please indicate whether you would be:

- extremely likely (7)
- quite likely (6)
- slightly likely (5)

- neither likely nor unlikely (4)
- slightly unlikely (3)
- quite unlikely (2)
- extremely unlikely (1)

to do what the statement refers to regarding the use of technology.

17. If I heard about a new technology, I would look for ways to experiment with it .

UNLIKELY	1	2	3	4	5	6	7	LIKELY
	Extremely	quite	slightly	neither	slightly	quite	extremely	

18. Among my peers I am usually the first to try out new technologies.

UNLIKELY	1	2	3	4	5	6	7	LIKELY
	Extremely	quite	slightly	neither	slightly	quite	extremely	

19. In general, I am hesitant to try out new technologies.
(note reverse scale values)

UNLIKELY	7	6	5	4	3	2	1	LIKELY
	Extremely	quite	slightly	neither	slightly	quite	extremely	

20. I like to experiment with new technologies.

UNLIKELY	1	2	3	4	5	6	7	LIKELY
	Extremely	quite	slightly	neither	slightly	quite	extremely	

<u>CEO Knowledge</u>

I am going to read some statements about your understanding of e-commerce technology. For each statement please indicate whether your understanding is:

- extremely high (7)
- quite high (6)
- slightly high (5)
- neither high nor low (4)
- slightly low (3)
- quite low (2)
- extremely low (1)

21. My understanding of e-commerce technology compared with my peers is:

LOW	1	2	3	4	5	6	7	HIGH
	extremely	quite	slightly	neither	slightly	quite	extremely	

22. I feel that my knowledge of e-commerce technology is:

LOW								HIGH
	extremely	quite	slightly	neither	slightly	quite	extremely	

Employee's Knowledge

I am going to read some statements about your employees' knowledge of e-commerce technology. Please tell me whether you:

- Strongly agree (5)
- Agree somewhat (4)
- Neither agree nor disagree (3)
- Disagree somewhat (2)
- Strongly disagree (1)

…with each of the following statements.

23. My employees are all computer literate.

DISAGREE___1___|___2___|___3___|___4___|___5___ AGREE
Strongly somewhat neither somewhat Strongly

24. There is at least one employee who is a computer expert.

DISAGREE___1___|___2___|___3___|___4___|___5___ AGREE
Strongly somewhat neither somewhat Strongly

25. I would rate my employees' understanding of computers as very good compared with other small companies in the same industry.

DISAGREE___1___|___2___|___3___|___4___|___5___ AGREE
Strongly somewhat neither somewhat Strongly

Behavioral intention to use the system

26. My staff and I *intend* to use the next level (describe) ____ in the next 6 months.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

27. I *predict* that my staff and I would use the system (the next level – describe) in the next 6 months.

UNLIKELY LIKELY
___1___|__2__|___3___|__4___|___5___|__6___|___7____
extremely quite slightly neither slightly quite extremely

28. My staff and I *plan* to use the next level (describe) ____ in the next 6 months.

UNLIKELY LIKELY

___1___|__2__|___3___|__4___|___5___|__6___|___7____

extremely quite slightly neither slightly quite extremely

29. On a scale of 0-100%, how much do you influence your company's decision to adopt e-commerce? _____ %

Demographics

Now I am going to ask you some questions about your company, and your involvement with the company.

30. Your company is located in which Atlantic Canadian Province _____.

31. What best describes the category of business the firm operates in?

1) Manufacturing
2) Services
3) Finance
4) Communications
5) Advertising
6) Retail
7) Oil & Gas
8) Tourism
9) Not for profit
10) Other (specify): _____

32. What is the age of the firm in years?

1) Less than one year
2) 1 – 3 years
3) 4 – 7 years
4) 8 – 10 years
5) More than 10 years

33. How many full and part time employees does the firm employ?

1) Less then 5
2) 6 – 10
3) 11 – 20
4) 21 – 50
5) 51 – 99
6) 100 – 150
7) 151 – 200
8) More than 200

34. What were your firm's gross sales last year?

1) Under $50,000
2) From $50,000 to under $100,000

3) From $100,000 to under $250,000
4) From $250,000 to under $500,000
5) From $500,000 to under $750,000
6) From $750,000 to under $1 million
7) From $1 million to under $2.5 million
8) $2.5 million and over

35. What best describes your position with the company?
1) Owner/CEO
2) IT Manager
3) Other Manager (please specify) _____
4) Other (please specify) _____

36. How many years have you been at this current position?
1) Less than 1 year
2) 1 – 3 years
3) 4 – 7 years
4) 8 – 10 years
5) 10 years +_____

37. How many years have you been with the company?
1) Less than 1 year
2) 1 – 3 years
3) 4 – 7 years
4) 8 – 10 years
5) 10 years +_____

38. Indicate gender of respondent: a) Male b) Female

39. What is the highest level of education you have completed?
1) Some high school
2) High School
3) Some Community College
4) Community College
5) Some University
6) University Degree
7) Master's
8) Doctorate
9) Other (please specify) _____

40. I am going to read a list of age ranges. Please indicate which range contains your age:
1) Under 25
2) 25 to 34
3) 35 to 44
4) 45 to 54
5) 55 to 64
6) 65 and over

That concludes our survey. Thank you for your help.

APPENDIX D: PILOT SURVEY DATA AND REPORT

A total of 31 owners-managers, or their designates, were surveyed for this pilot study. In order to complete the survey, individual firms were contacted in advanced and screened for their suitability. To be considered suitable, the firm had to meet the definition of a SMEs that was adopted for this research, with SMEs being defined as companies that have fewer than 200 employees. Furthermore, as justified in the Research Methodology chapter, the owners-managers, or their designates, had to have at least 50% influence over e-commerce adoption decisions in order to participate. After it was determined that the potential respondent and his or her firm met the appropriate criteria, the survey was completed, or an arrangement was made to complete the survey on a specific date and time. A total number of 131 firms were contacted to complete the survey, of which 14 failed to meet the criteria: having fewer than 200 employees and/or the owner-manager or his/her designate having at least 50% influence on e-commerce adoption decisions. Of the remaining 117 firms, 31 participated in the survey, resulting in a response rate of 27%.

Non-response bias

As indicated in the Research Methodology chapter, one of the potential limitations of the research is non-response bias. A common method to check for non-response bias in phone surveys is to compare the demographic results of the respondents to the demographics of the target population (Zikmund 2003; MacGregor & Gomes 1999). Upon reviewing the demographic information of the respondents and comparing it to that of the region, the researcher found little difference in the geographical location of the respondents, the categories of business, the age of firm, and the number of employees. Thus, the researcher concluded that non-response bias is not a limitation for the pilot survey.

Demographic information (Q31 – 39)

This section describes the demographic information of the respondents. The presentation of demographic information highlights key characteristics and aids in understanding the research.

Geographical information (Q31)

The survey was directed at SMEs from the four Atlantic Canadian provinces: New Brunswick, Newfoundland, Nova Scotia, and Prince Edward Island (see Table D.1). The table indicates that the majority of participants (45.2%) come from Nova Scotia, which makes sense, as Nova Scotia's population is roughly 41% of the Atlantic Canadian region (ACOA 2005). Overall, participant numbers reflect the population of the region.

Table D.1: Geographical distribution of responses

Province	Number	Percent
New Brunswick	7	22.6%
Newfoundland	7	22.6%
Nova Scotia	14	45.2%
Prince Edward Island	3	9.7%
Total	31	100.0%

Business category (Q32)

Responses came from businesses that operate in a number of business categories. The largest category of companies represented in the study came from the service industry (29.0%), followed by manufacturing (22.6%) and retail (12.9%). As indicated in the table, respondents came from a variety of businesses, which addresses one of the goals of the research, to investigate the use of e-commerce by SMEs in all Atlantic Canadian industries.

Table D.2: Business Category

Category	Number	Percent
Services	9	29.0%
Manufacturing	7	22.6%
Retail	4	12.9%
Other	4	12.9%
Tourism	3	9.7%
Finance	2	6.5%
Not-for-profit	2	6.5%
Total	31	100.0%
Other categories included: agriculture (1), health care (1), real estate (1), sports and leisure (1).		

Age of the firm (Q33)

Almost half of the firms had been in business for over ten years, with more than 75% of the firms having been in business for more than four years. See Table D.3.

Table D.3: Age of the firm

Years in Business	Number	Percent
Less than one year	3	9.7%
1 – 3 years	4	12.9%
4 – 7 years	5	16.1%
8 – 10 years	5	16.1%
More than 10 years	14	45.2%
Total	31	100.0%

Size of the firm (Q34)

Most firms would be classified as small SMEs, with 29% of the businesses stating that they had fewer than five employees (see Table D.4). Over half of the firms interviewed reported having fewer than ten employees (51.6%). This reflects both the demographics of Canada and Atlantic Canada, as both regions are known for their smaller SMEs (ACOA 2005).

Table D.4: Size of the firm

Number of full time equivalent employees	Number	Percent
Less then 5	9	29.0%
6 – 10	7	22.6%
11 – 20	3	9.7%

21 – 50	5	16.1%
51 – 99	3	9.7%
100 – 150	2	6.5%
151 – 200	2	6.5%
Total	31	100.0%

Positions held by respondents and influence on e-commerce adoption decisions (Q35, Q30)

In order to ensure that the respondents in the survey participated in e-commerce decisions, the researcher's target participants were owner-managers, who were asked to state the degree of influence that they have on the adoption of e-commerce technologies within the firm. If the owner-manager was not active in decision making or felt someone in the firm was better suited to answer the survey then this designate was considered acceptable.

Respondents were most likely to be the owner or CEO (38.7%), but 29% were other managers, and 32.2% consisted of those in other positions (see Table D.5). The most common other positions included office administrators, general organizers, or administrative assistants.

Results indicated that respondents had influence over the adoption of e-commerce technologies. On a scale of 0% to 100%, the average influence was 76.3%.

Table D.5: Position held by respondents

Position	Number	Percent
Owner/CEO	12	38.7%
IT Manager	0	0.0%
Other Manager	9	29.0%
Other	10	32.2%
Totals	31	100.0%

Time respondents held position (Q36)

Participants' time with their respective companies was spread out, with the highest number of respondents indicating that they spent more than 10 years with their respective firm (32.2%). This was followed by respondents who indicated that they spent four to seven years at their firm at 22.6%. See Table D.6.

Table D.6: Time respondents held position

Years in Business	Number	Percent
Less than one year	4	12.9%
1 – 3 years	5	16.1%
4 – 7 years	7	22.6%
8 – 10 years	5	16.1%
More than 10 years	10	32.2%
Total	31	100.0%

Gender of respondents (Q37)

The majority of respondents indicated that they were female. See Table D.7.

Table D.7: Gender of Respondents

Gender	Number	Percent
Female	17	54.8%
Male	13	41.9%
Non-response	1	3.2%
Totals	31	100.0%

Education level of respondents (Q38)

In response to the question about highest level of education completed, most indicated that they had a university degree (45.2%). The second largest group of respondents indicated that they had received a community college credential (25.8%). See Table D.8 for a full description of the respondents' educational level.

Table D.8: Education level of respondents

Highest level of education completed	Number	Percent
Some high school	0	0%
High School	2	6.5%
Some Community College	2	6.5%
Community College	8	25.8%
Some University	3	9.7%
University Degree	14	45.2%
Master's Degree	2	6.5%
Doctorate	0	0%
Total	31	100.0%

Age of respondents (Q39)

The age of the respondents was spread out over all of the categories used in the questionnaire. Most were between the ages of 35 and 54 (61.6%), with the largest single age group being between 35 and 44 (35.4%). See Table D.9 for a full breakdown.

Table D.9: Age of the respondents

Age in years	Number	Percent
Under 25	1	3.2%
25 – 34	5	16.1%
35 – 44	11	35.4%
45 – 54	8	25.8%
55 – 64	5	16.1%
65 and over	1	3.2%
Total	31	100.0%

Nature and extent of e-commerce (Q1)

In order to gain an understanding of the use of e-commerce in SMEs respondents were asked a series of questions about whether they did or did not use specific e-commerce technologies. If respondents selected 'yes' then they were asked to rate the frequency of use on a scale of 1 – 7 with 1 indicating extremely frequent use of the technology and 7 indicating extremely infrequent use. See Table D.10 for a description of the uses of the e-commerce and the frequency of use.

The most common use of Internet by respondents was e-mail, with 96.8% using e-mail to correspond with customers, 93.5% within the company, and 93.5% with suppliers. E-mail was used frequently to communicate with customers (M=5.567) and internally (M=5.931). However, e-mail was rarely used as a form of communication with suppliers (M=1.065).

Respondents indicated that they browsed the web for information on suppliers (93.5%), customers (90.3%), and competitors (83.9%). However, the majority of firms indicated that they are neither likely nor unlikely to engage in web browsing.

Respondents were asked about their ordering of supplies via the Internet. Over 90% indicated that they made purchases based on information that they saw on the Internet, using the Internet, e-mail, or telephone to complete the transaction. Companies stated that they are slightly likely to neither likely nor unlikely to engage in such transaction (M=3.821). Businesses were less likely to complete purchases completely online, including the placing of orders and processing payment (71%) with a reported frequency of M=3.455.

When asked about the sale of goods using the Internet, 51.5% of respondents reported that they advertise their products or service online. Customers can complete transactions using a variety of ordering and payment methods, including e-mail, telephone, or directly on the website. Firms that sell goods online using these payment and processing methods describe the frequency of their activity as slightly unlikely (M=3.438). Firms that offer customers complete online ordering and processing of their goods and services represent only 32.3% of the sample, and they are quite unlikely to engage to slightly likely to engage in such activities (M=2.700).

Table D.10: Use and extent of use of e-commerce SMEs

	Frequency of Use of Function[1]						
Function	**Number**	**Percent**	**Number**	**Mean**	**Std. Deviation**	**Minimum**	**Maximum**
Use e-mail with customers	30	96.8%	30	5.567	1.695	2	7
Use e-mail within the company	29	93.5%	29	5.931	1.791	1	7
Use e-mail with suppliers	29	93.5%	31	1.065	0.250	1	2
Browse web for information on suppliers	29	93.5%	29	4.241	2.247	1	7
Browse web for information on customers	28	90.3%	27	4.444	2.276	1	7
Browse web for information on competitors	26	83.9%	26	4.423	1.963	1	7
Make purchases from websites via the	28	90.3%	28	3.821	1.906	1	7

Internet via telephone or e-mail							
Make transactions completely online including the placing of the order and payment	22	71.0%	22	3.455	2.087	1	7
Electronic Data Interchange (EDI)	18	58.1%	18	4.278	2.164	1	7
Sell goods through the Internet by allowing customers to phone or e-mail orders	16	51.6%	16	3.438	2.032	1	7
Complete full transactions using the Internet including order acceptance and processing payment	10	32.3%	10	2.700	2.359	1	7
Participate in online auctions	11	35.5%	11	2.091	1.868	1	7
[1] Scale: 1) Extremely unlikely, 2) Quite unlikely, 3) Slightly unlikely, 4) Neither likely nor unlikely, 5) Slightly likely, 6) Quite likely, 7) Extremely likely							

Respondents' website use (Q2, Q3)

Respondents were then asked if they had a website. Those that did were then questioned on its features and functions. Most firms (74.2%) had websites, but the use of websites as a marketing or supply chain management tool was limited. Most websites allowed customers to e-mail the firm or to get company information. Very few websites allowed customer tracking of products or used multi-media (13.0% each).

Table D.11: Website Use

Function	**Number**	**Percent**
Have website	23	74.2%
Website Features		
Contact information for the company	23	100.0%
Allow visitors to e-mail company directly from the website	23	100.0%
Calculate shipping costs for a product	22	95.7%
Track shipping time of a product	22	95.7%
Information about product, including pictures and descriptions	21	91.3%
Allow customers to use the telephone or an e-mail address to place an order from the website	16	69.6%
Answers to frequently asked questions (FAQ)	10	43.5%
Allow customers to post reviews of company products	8	34.8%
Provide a bulletin board to post comments on products, your company, etc.	6	26.1%
Allow customers to purchase products directly from the	4	17.4%

website using a credit card or EDI		
Make recommendations for customer purchases	4	17.4%
Have online chat	4	17.4%
Track customers current and past purchases	3	13.0%
Use multi-media, such as web videos, product demonstrations, etc.	3	13.0%
Sample size = 31 responded to question about website. Only the firms with a website responded to subsequent questions about website features (n=23).		

Level of e-commerce use (Q4)

In order to further understand the nature and extent of e-commerce use in firms, respondents were asked to classify their level of e-commerce use into one of six stages. All firms reported some e-commerce use, with no firm rating their e-commerce adoption at Level I. The most common level was III (25.8%). Only 12.9% had achieved a top ranking of Level VI. See Table D.12 for a summary of the results.

Table D.12: Level of e-commerce use in firms

Level/Stage of E-commerce use	Number	Percent
I: No use of e-commerce technology	0	0.0%
II: Using basic web browsing and e-mail	7	22.6%
III: Maintaining a website for promotional purposes, engaging in e-mail and Internet browsing	8	25.8%
IV: Taking orders via the website and/or making online purchases	7	22.6%
V: Completing online purchasing and selling transaction, making and accepting online payments	5	16.1%
VI: Completing all transactions on the Internet, using an interactive website and personalized webpages for suppliers and buyers	4	12.9%
Total	31	100.0%
Sample size = 31		

Reasons given for not adopting more sophisticated technologies (Q5)

Respondents who did not indicate that they were at Level VI were asked why they have not adopted more sophisticated technologies. The reason given for not adopting higher levels of e-commerce was that they did not think it was useful for their type of

business. There was unanimity in this response among all firms that were not at the top adoption level (75%).

Intentions of respondents to adopt more sophisticated technologies (Q27-29)

The survey then asked firms about future adoption intentions. The firms indicated nearly identical responses to the three questions with respondents describing that their intentions to adopt the next level of e-commerce technology were quite unlikely.

Table D.13: Intentions to adopt further e-commerce technology

Sample size = 31	Number	Mean	Std. Deviation	Minimum	Maximum
Intention to use the next level of e-commerce technology in six months	31	1.962	1.800	1	7
Predict that they will use the next level of e-commerce technology in six months	31	1.962	1.865	1	7
Plan to use the next level of e-commerce technology in six months	31	1.923	1.809	1	7
Scale: 1) Extremely unlikely, 2) Quite unlikely, 3) Slightly unlikely, 4) Neither likely nor unlikely, 5) Slightly likely, 6) Quite likely, 7) Extremely likely.					

Model questions (Q6 - 26)

A series of scaled items were used to measure the following:

- Performance Expectancy
- Effort Expectancy
- Social Influence
- CEO Innovation
- CEO Knowledge
- Employees' Knowledge

Each was measured using the following scale: 1) extremely unlikely, 2) quite unlikely, 3) slightly unlikely, 4) neither likely nor unlikely, 5) slightly likely, 6) quite likely, and 7) extremely likely.

The ratings of each individual item, in each scale, are presented in this section of the study, along with the reliability rating of each scale.

Performance expectancy (Q6 – 9)

Respondents were not convinced that adopting the next level of e-commerce would impact the firm's performance. Firms were generally unconvinced that they would find the next level of e-commerce adoption useful or that it would enhance efficiency, productivity and profitability. All ratings fell between slightly unlikely

and neither likely nor unlikely, with a considerable leaning towards the unlikely end of the scale. These results indicate that the decision makers did not really understand how enhancing e-commerce could impact their firm. See Table D.14 for a summary of the results.

Table D.14: Adoption of e-commerce Technology Scale Questions

Sample size = 31	Number	Mean	Std. Deviation	Minimum	Maximum
I would find the next level of e-commerce technology useful for my staff and I	26	3.385	2.368	1	7
Using the next level of e-commerce technology would enable my staff and I to accomplish tasks more quickly	26	3.154	2.111	1	6
Using the next level of e-commerce technology would increase productivity for my staff and me	26	3.115	2.16	1	7
If my staff and I use the next level of e-commerce technology, it will increase the profitability of the company	26	3.154	2.222	1	7

Effort expectancy (Q10 – 13)

Respondents seemed to have little confidence that their firm could upgrade to the next level of e-commerce without exerting considerable effort. When it came to expectations about ease of use, understanding and skills, respondents rated each scale item in the 3-range of slightly unlikely. The results are summarized in Table D.15.

Table D.15: Effort Expectancy

Sample size = 31	Number	Mean	Std. Deviation	Minimum	Maximum
Our interaction with the next level of e-commerce technology will be clear and understandable.	26	2.885	2.222	1	6
It would be easy for my staff and me to become skillful at using the next level of e-commerce technology.	26	2.962	2.026	1	6
My staff and I would find the next level of e-commerce technology easy to use.	26	2.923	2.088	1	6
Learning to operate the next level of e-commerce technology would be easy for my staff and I.	26	2.885	2.018	1	6

Social influence (Q14 – 17)

Respondents indicated that there was little influence exerted by others. Most provided ratings in the 2-range of quite unlikely to the influence of others on e-commerce adoption. There was a slightly higher rating for expectation of support for enhanced e-commerce technology adoption, but the rating was only in the 3-range, which is slightly unlikely. Results are summarized in Table D.16.

Table D.16: Social Influence

Sample size = 31	Number	Mean	Std. Deviation	Minimum	Maximum
People who influence me think that my staff and I should use the next level of e-commerce technology.	26	2.962	1.969	1	6
People who are important to me think that my staff and I should use the next level of e-commerce technology.	26	2.846	1.953	1	6
My staff and I would be supported by other senior managers of this business in the use of the next level of e-commerce technology.	26	3.077	2.189	1	6
In general, the organization will support the use of the next level of e-commerce technology.	26	3.077	2.189	1	6

CEO Innovation (Q18 – 21)

Respondents perceived themselves as being somewhat innovative, generally trying out new technologies and experimenting with them. One fquestion was reverse scored. However, despite this, respondents still rated themselves as being high on the scale, a negative trait. This shows that they are still hesitant to take on new technologies. Most respondents indicated that they were between neither likely nor unlikely (4) and slightly likely (5) to be innovative, given the items in the scale. The results are shown in Table D.17.

Table D.17: CEO Innovation

Sample size = 31	Number	Mean	Std. Deviation	Minimum	Maximum
If I heard about a new technology I would find ways to experiment with it.	31	4.365	1.644	1	7
Among my peers I am the first to try out new information technologies.	31	4.548	2.063	1	7
In general, I am hesitant to try out new technologies.[1]	31	4.935	1.965	1	7
I like to experiment with new information technologies.	31	5.000	1.483	1	7

[1]This item used a reverse scale: 7) Extremely unlikely, 6) Quite unlikely, 5) Slightly unlikely, 4) Neither likely nor unlikely, 3) Slightly likely, 2) Quite likely, 1) Extremely likely.

4.9.2 CEO Knowledge

CEO knowledge (Q22 – 23)

Respondents rated their knowledge as close to slightly high. This does not represent a confident rating of knowledge, but clearly, respondents felt that they had enough knowledge about e-commerce technology to get by. The results are shown in Table D.18.

Table D.18: CEO's Knowledge

Sample size = 31	Number	Mean	Std. Deviation	Minimum	Maximum
My understanding of e-commerce technology compared with my peers is:	31	5.000	1.461	1	7
I feel that my knowledge of e-commerce technology is:	31	4.548	1.362	2	7

Employees' knowledge (Q24 – 26)

Firms seemed to have limited information upon which to base an assessment of their employees' knowledge of e-commerce. Ratings hovered around the neither agree nor disagree rating. The results are shown in Table D.19.

Table D.19: Employees' Knowledge

Sample size = 31	Number	Mean	Std. Deviation	Minimum	Maximum
My employees are all computer literate	31	3.065	1.209	1	5
There is at least one employee who is a computer expert	31	3.710	1.465	1	5
I would rate my employees' understanding of computes as very good compared with other small companies in the same industry	31	3.258	0.93	1	4

Data analysis

The following section consists of a data analysis of the pilot survey. The analysis starts with an assessment of the reliability of the scales in the model, then discusses the factor scores before concluding with a test of the model in section.

Since this is a pilot study, the number of respondents often fell below the recommended limit for research techniques. For example, while there is no recognized standard for sample size and factor analysis, the recommended minimum is 200 subjects (Garson 2005). The rule of thumb for sample size in multiple regression is 20 times the number of cases as independent variables, and the recommended sample for discriminate analysis is four or five times as many cases as independent variables (Garson 2005).

Reliability of the scales used in the model

Each additive scale was subjected to a Cronbach's Alpha test to determine overall scale reliability. Reliability addresses the degree to which measures are free from error, that they produce consistent results, and that they are consistent and stable (Zikmund 2003; Cooper & Schnidler 2001; O'Leary-Kelly & Vokurka 1998). Cronbach's Alpha results in a coefficient ranging from 0-1, with reliability being higher as the coefficient approaches 1 (Garson 2005). Researchers do not agree on an acceptable coefficient, but the generally accepted standards of Cronbach's Alpha scores were adopted for this study, as follows: .60 for exploratory research, .70 for adequate confirmatory purposes, and .80 for good confirmatory purposes (Garson 2005; Hair Anderson, Tatham, & Black 1998). The results revealed very high alpha levels for all scales except for Employees' Knowledge. Using the research norm for an alpha level region of acceptability of 0.60 for exploratory research, the reliability coefficient for Employees' Knowledge was too low to be used. As a result of this finding, the scale was eliminated from further analyses. The results are summarized in Table D.20.

Table D.20: Descriptive Statistics and Reliability Analysis for Scaled Items

Descriptive Statistics and Reliability Analysis for Scaled Items (Sample size = 31)	Number	Mean	Std. Deviation	Minimum	Maximum	Cronbach's Alpha
CEO Innovativeness	31	8.968	4.385	-2.0	16.0	0.702
CEO Knowledge	31	9.548	2.567	3.0	14.0	0.789
Employees' Knowledge	31	10.032	2.601	3.0	14.0	0.508
Performance Expectancy	26	12.808	8.722	4.0	27.0	0.989
Effort Expectancy	26	11.654	8.064	4.0	24.0	0.994
Social Influence	26	11.962	8.136	4.0	24.0	0.985

Confirmatory factor analysis for the scales

A factor analysis was conducted on the scales to verify if they resulted in measures similar to those in the literature review. To conduct a confirmatory factor analysis, principle components analysis is the standard, combined with varimax rotation, an orthogonal rotational method (Cooper & Schnidler 2001). In addition, confirmatory factor analysis can be used to reduce the number of variables, which will explain the variability between the various items (Reyment & Joreskog 1993, Bryman & Cramer 1990; Ferguson 1971; Schmitt & Klimoski 1991). Confirmatory factor analysis was used as it has been deemed appropriate for studies that are based on a strong theoretical and/or empirical foundation (Stevens 1996).

As previously mentioned, the scale for Employees' Knowledge was eliminated from the analysis because it was not a reliable scale, given its low Cronbach's Alpha level. The variable of business size (number of employees) was added to the factor analysis as well in keeping with the model. Prior to conducting the analysis, two standard tests were run to determine if the data was suitable for such a technique.

The Kolmogorov-Smirnov test (K-S test) was used to test for normality, which is defined as a normal distribution of the data and is assumed in many statistical procedures. The K-S test is recommended for use with samples of less than 50 (Garson 2005). The K-S test indicated that the sample departed slightly from normality for business size, performance expectations, effort expectations, and social influence, with business size having the greatest departure from normality. This was reflected in the resulting factor loadings for that particular variable. Since this is a pilot study with a small sample size, it is not unusual. A larger sample size, such as the one in the full study, would be expected to result in a greater degree of multivariate normality.

The Kaiser-Meyer-Olkin (KMO) measures sampling adequacy, which predicts if the data is likely to factor well based on correlation and partial correlation (Garson 2005). A KMO statistic is produced for each individual variable, and their sum is used as the KMO statistic, which ranges from 0 to 1.0. The standard acceptability for KMO should be .60, as this indicates that the sample is acceptable for factor analysis (Hair, Anderson, Tatham & Black 1998), although some researchers use .50 as a relaxed cutoff (Hutcheson & Sofroniou 1999; Kaiser 1974). The KMO statistic was .573, when a statistic of at least .60 was preferred. This may indicate that the

model had some multicollinearity but that the results were borderline and acceptable using a lenient cutoff. Given that this is a pilot test, and that the sample size was small (n=31), such results were not unexpected.

The factor analysis was used with all of the variables to test the model. The analysis did conform to past research, extracting two factors. The model explained 78.2% of the cumulative variance in the model. Factor loadings were very high for scale items, but not high for business size. The factor scales loaded heavily on two different factors with no overlap or conflict. The results are summarized in Table D.21.

Table D.21: Rotated Component Matrix for Scale Values and Business Size

		Factor	
		1	2
CEOINNOV	CEO Innovativeness	-0.253	***0.854***
CEOKNOW	CEO IT Knowledge	-0.040	***0.950***
BUSSIZE	*Business Size (Number of Employees)*	*0.262*	*0.373*
PERFEXP	Performance Expectations	***0.959***	-0.096
EFFEXP	Effort Expectations	***0.956***	0.076
SOCINFL	Social Influence	***0.965***	-0.084
Extraction Method: Principal Component Analysis.			
Rotation Method: Varimax with Kaiser Normalization.			
Rotation converged in 3 iterations.			

Based on the analysis, two factors were extracted:

- Factor 1: CEO IT Focus (CEO Innovativeness and Knowledge)
- Factor II: Expectations and Influence (Performance and Effort Expectations and Social Influence)

Business size did not load heavily on either factor but its essence is still maintained in saved factor scores. However, business size was of limited value in the factor analysis. Performance expectations, effort expectations, and social influence loaded heavily on one factor. However, these variables showed a degree of multicollinearity and some departure from normality, so such outcomes could be anticipated.

Model testing

In order to provide some structure to the data analysis, the following four issues will be examined:
1. The ability of the model to explain the variance (R^2_a) in SMEs e-commerce adoption levels.
2. The ability of the model to predict/classify users into groups of e-commerce users.
3. The ability of the model to explain the variance (R^2_a) in SMEs' intentions to adopt e-commerce or to adopt more sophisticated e-commerce technologies.
4. The ability of the model to predict SMEs' intentions to adopt e-commerce or to adopt more sophisticated e-commerce technologies.

Each issue is treated independently using the methodologies discussed earlier in this study.

1: The ability of the model to explain the variance (R^2_a) in SMEs e-commerce adoption levels.

2: The ability of the model to predict/classify users into groups of e-commerce users.

As discussed in the Research Methods chapter, a regression analysis was performed using the factor scores. The test did not explain a great amount of variance (R^2_a =-0.047). The results of the analysis are summarized in Table D.22.

The results are impacted by the limitations on the data going into the regression analysis. The departure from multivariate normality and some multicollinearity within the factors themselves impacted the value of the factor model in explaining e-commerce adoption level. However, it is more suitable to use factor analysis when testing such a model, particularly if there is multicollinearity present among independent variables (Garson 2006). Multicollinearity is not present between independent variables when factor scores are used, because the individual scale values load definitively on different factors. This analysis was not affected by multicollinearity, directly. However, there is evidence that multicollinearity may have impacted the factor solution that was then regressed against e-commerce technologies adoption level. The condition indices from collinearity diagnostics were equal to 1.0, indicating that multicollinearity did not impact the regression analysis from the factor scores.

These results revealed that there is no significant relationship between the factor scores and level of E-commerce technology adoption.

Table D.22: Regression Analysis of Factor Scores on e-commerce Adoption Level

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.191	0.037	-0.047	0.516

Predictors: (Constant), Factor 1 and Factor 2

Analysis of Variance on Regression Model

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	0.232	2.000	0.116	0.437	0.651
Residual	6.114	23.000	0.266		
Total	6.346	25.000			

Predictors: (Constant), Factor 1 and Factor 2

Dependent Variable: Adoption Level

No significant correlations from .000 to .050

Regression Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model	B	Std. Error	Beta		
(Constant)	0.423	0.101		4.184	***0.000***
Factor 1	-0.017	0.103	-0.034	-0.164	0.871
Factor 2	0.095	0.103	0.188	0.921	0.367

Dependent Variable: Adoption Level

Collinearity Diagnostics

Model	Dim-ension	Eigen-value	Cond. Index	Variance Proportions (Constant)	Factor 1	Factor 2
1	1	1	1	0.000	1	0
	2	1	1	1	0.000	0
	3	1	1	0	0	1

Dependent Variable: Adoption Level

The relationship was also tested using discriminant analysis to see if there was a way to predict level of e-commerce adoption, given factor scores for each firm. The results confirmed what the regression analysis indicated: that there is no significant relationship between the factor scores and level of e-commerce adoption. The results are summarized in Table D.23.

Table D.23: Discriminant Analysis of Factor Scores on Level of e-commerce Adoption

Discriminant Analysis of Factor Scores on Level of e-commerce Adoption

Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	0.038	100.000	100.000	0.191

First canonical discriminant function was used in the analysis.

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	0.963	0.858	2	0.651

No significant functions from .000 to .050

Standardized Canonical Discriminant Function Coefficients

	Function
	1
Factor 1	-0.179
Factor 2	0.985

Structure Matrix

	Function
	1
Factor 1	0.984
Factor 2	-0.173

A final regression analysis on the e-commerce level was conducted using only the scales and business size, without conducting a previous factor analysis. Some evidence of multicollinearity was present in the analysis, as indicated in the Collinearity Diagnostic section of the table. Collinearity Diagnostic is a standard tool in SPSS that checks for multicollinearity. When the condition indices surpass 15.0, it indicates that there is some likelihood of multicollinearity, and a condition index of 30.0 indicates that the dataset is not suitable for regression analysis. In this analysis, some of the scales indices approached 15.0, but none surpassed 30.0, thus indicating the results are suitable for multiple regression.

The resulting analysis did not explain a significant level of variance, indicating that there were no statistically significant relationships between the scale factors, business size, or adoption level for e-commerce technology (R^2_a=-0.154). The results are summarized in Table D.24.

Table D.24: Regression Analysis of Scales on Level of Adoption of e-commerce

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.351	0.123	-0.154	0.541

Predictors: (Constant), SOCINFL, CEOKNOW, BUSSIZE, CEOINNOV, EFFEXP, PERFEXP

Analysis of Variance on Regression Model

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	0.783	6.000	0.130	0.445	0.839
Residual	5.564	19.000	0.293		
Total	6.346	25.000			

Regression Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model	B	Std. Error	Beta		
(Constant)	-0.103	0.497		-0.208	0.838
CEOINNOV	-0.024	0.044	-0.204	-0.544	0.593
CEOKNOW	0.081	0.076	0.418	1.055	0.305
BUSSIZE	0.001	0.003	0.119	0.476	0.639
PERFEXP	0.016	0.039	0.274	0.401	0.693
EFFEXP	-0.033	0.034	-0.527	-0.970	0.344
SOCINFL	0.009	0.043	0.147	0.211	0.835

Dependent Variable: Adoption Level

Collinearity Diagnostics

Model	Dimension	Eigenvalue	Condition Index	Constant
1	1	5.650	1.000	0.001
	2	0.647	2.956	0.002
	3	0.556	3.187	0.004
	4	0.076	8.643	0.330
	5	0.037	12.305	0.004
	6	0.022	15.890	0.191
	7	0.011	22.343	0.467

Variance Proportions

CEO-INNOV	CEO-KNOW	BUS-SIZE	PERF-EXP	EFF-EXP	SOC-\INFL
0.002	0.001	0.007	0.001	0.001	0.001
0.017	0.003	0.157	0.009	0.010	0.008
0.020	0.002	0.585	0.000	0.001	0.001
0.271	0.002	0.004	0.002	0.076	0.000
0.162	0.051	0.045	0.035	0.636	0.219
0.017	0.117	0.006	0.696	0.169	0.237
0.511	0.825	0.196	0.256	0.106	0.535

Dependent Variable: Adoption Level

A discriminant analysis, using only the model's scales and business size, confirmed what the regression analysis had shown, that there was no statistically significant difference between high level of adopters of e-commerce and low levels of e-commerce adopters, with regard to the model's scales. The Box's M statistic

confirmed that the covariance matrices were multivariate, normally distributed, and that discriminant analysis was an appropriate test for the sample data. The results are summarized in Table D.25.

Table D.25: Discriminant Analysis of Scales and Business Size and Level of e-commerce Adoption

Log Determinants

E-commerce Adoption Level	Rank	Log Determinant
Low level of adoption	6	19.240
High level of adoption	6	17.397
Pooled within-groups	6	20.144

The ranks and natural logarithms of determinants printed are those of the group covariance matrices.

Test Results

Box's M		40.112
F	Approx.	1.361
	df1	21.000
	df2	1704.109
	Sig.	0.126

Tests null hypothesis of equal population covariance matrices.

Eigenvalues

Function	Eigen-value	% of Variance	Cumulative %	Canonical Correlation
1	0.141	100.000	100.000	0.351

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	0.877	2.764	6	0.838

Standardized Canonical Discriminant Function Coefficients

Adoption Level of IT	Function
	1
CEOINNOV	-0.619
CEOKNOW	1.239
PERFEXP	0.833
EFFEXP	-1.598
BUSSIZE	0.357
SOCINFL	0.447

Structure Matrix

Adoption Level of e-commerce	Function
	1
CEOINNOV	0.611
CEOKNOW	0.479

PERFEXP	-0.216
EFFEXP	0.208
BUSSIZE	-0.145
SOCINFL	-0.094

Functions at Group Centroids

	Function
Adoption Level of e-commerce	1
Low level of adoption	-0.309
High level of adoption	0.421

3: The ability of the model to explain the variance (R^2_a) in SMEs' intentions to adopt e-commerce or to adopt more sophisticated e-commerce technologies.

4: The ability of the model to predict SMEs' intentions to adopt e-commerce or to adopt more sophisticated e-commerce technologies.

A regression analysis was conducted to determine the impact of business size and model scale values on the respondent's behavioural intensity to adopt e-commerce or further their e-commerce use. The results were statistically significant, revealing that the first factor (CEO IT Focus) had a statistically significant impact on the intensity of the firm's intention to enhance its e-commerce technology. The resulting equation showed that a one-unit increase in the factor score would have a 3.251-unit increase in the behavioural intensity (degree of intention) to adopt e-commerce. The results are summarized in Table D.26.

These results are impacted in a similar way to earlier results reported for regression of scales against e-commerce adoption level. There is some indication that factor analysis is impacted by multicollinearity among Factor 2 variables: Expectations and Influence (Performance and Effort Expectations and Social Influence). Also, departures from multivariate normality may have impacted the same factor as well as business size measures within the factor solution.

Table D.26: Regression Analysis of Factor Scores on Behavioural Intention to Adopt Next Level of e-commerce

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.601	0.361	0.306	4.550

[1]Equation: Behavioural Intention to Adopt e-commerce = 5.846 + 3.251(Factor 1 Score)

Analysis of Variance on Regression Model

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	269.143	2.000	134.572	6.499	***0.006***
Residual	476.241	23.000	20.706		
Total	745.385	25.000			

Regression Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
Model	B	Std. Error	Beta		
(Constant)	5.846	0.892		6.551	***0.000***
Factor 1	3.251	0.910	0.595	3.572	***0.002***
Factor 2	0.447	0.910	0.082	0.491	0.628

Collinearity Diagnostics

				Variance Proportions		
Model	Dimen-sion	Eigen-value	Condi. Index	(Constant)	Factor 1	Factor 2
1	1	1	1	0.000	1	0
	2	1	1	1	0.000	0
	3	1	1	0	0	1

The relationship was also tested using discriminant analysis. The analysis showed a significant relationship with Factor Score 1 and Behavioural Intensity to Adopt the next level of information technology. However, the test was unreliable because it violated the assumption of equality of covariance matrices, with a significant result for Box's M. A summary of the results appears in Table D.27. The outcomes also reflect the inherent instability of the second factor score due to violations of the assumption of multivariate normality and multicollinearity. The regression analysis was not directly impacted by multicollinearity due to the factor analysis that had been conducted previously. The condition indices are equal to 1.0, indicating that multicollinearity is not a problem in the regression analysis.

Table D.27: Discriminant Analysis of Factor Scores on Behavioural Intention to Adopt Next Level of e-commerce

Box's M Analysis for Test of Equality of Covariance Matrices

Log Determinants

E-commerce Adoption Level	Rank	Log Determinant
Low level of adoption	2	0.017
Medium Level of e-commerce Adoption	2	-8.909
High level of adoption	2	-8.417
Pooled within-groups	2	-0.307

Test Results

Box's M		27.283
F	Approx.	2.774
	df1	6.000
	df2	234.188
	Sig.	***0.013***

Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	0.589	98.300	98.300	0.609
2	0.010	1.700	100.000	0.101

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	0.623	10.654	4.000	***0.031***
2	0.990	0.229	1.000	0.632

Standardized Canonical Discriminant Function Coefficients

	Function 1	Function 2
Factor 1	1.000	-0.037
Factor 2	0.058	0.999

Structure Matrix

	Function 1	Function 2
Factor 1	0.998	-0.058
Factor 2	0.037	0.999

A basic analysis, using only regression without preliminary factor analysis, revealed that there were significant relationships between performance expectation, effort expectation, social influence, and behavioural intensity to adopt the next level of e-commerce technology. However, the analysis was problematic. Some evidence of multicollinearity was present in the analysis. As previously stated, condition indices of more than 15.0 indicate that there is some likelihood of multicollinearity. However, none of the condition indices approached 30.0, which would indicate that the dataset was not suitable for regression analysis. In addition, the constant was not statistically significant. While this can occur in some studies, it is not commonly observed.The R-Square indicates that the variables explained 87% of the variance in behavioural intention to adopt IT and that adjusted R-Square illustrates that the model explains 83% of the variance. The resulting regression equation was:

Behavioural Intensity to Adopt e-commerce = 1.784 – 1.204(PERFORMANCE EXPECTATION) + 0.647(EFFORT EXPECTATION) + 1.082(SOCIAL INFLUENCE).

Each scale value was measured on the following 7-point Likert scale:
1) Extremely unlikely, 2) Quite unlikely, 3) Slightly unlikely, 4) Neither likely nor unlikely, 5) Slightly likely, 6) Quite likely, and 7) Extremely likely.

Therefore, those with a lower unlikely rating are likely to have a lower behavioural intensity to adopt e-commerce. The negative relationship between behavioural intensity to adopt e-commerce and performance expectation is unusual, because it indicates that respondents could not understand the benefits of e-commerce adoption or enhancement. This is consistent with the previous analysis that examined the overall scale averages and statistics. The results are summarized in Table D.28.

Table D.28: Regression Analysis on Scales and Business Size and Behavioural Intention to Adopt e-commerce

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.933	0.871	0.830	2.250

Predictors: (Constant), SOCINFL, CEOKNOW, BUSSIZE, CEOINNOV, EFFEXP, PERFEXP

Analysis of Variance on Regression Model

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	649.209	6.000	108.202	21.376	***0.000***
Residual	96.175	19.000	5.062		
Total	745.385	25.000			

(Continued from Table 21)
Regression Coefficients

	Unstandardized Coefficients		Stand-ardized Coeffi-cients	t	Sig.
Model	B	Std. Error	Beta		
(Constant)	1.784	2.066		0.863	0.399
CEOINNOV	0.077	0.182	0.061	0.423	0.677
CEOKNOW	-0.148	0.318	-0.071	-0.467	0.646
BUSSIZE	-0.008	0.011	-0.067	-0.693	0.496
PERFEXP	-1.204	0.164	-1.923	-7.333	***0.000***
EFFEXP	0.647	0.141	0.955	4.582	***0.000***
SOCINFL	1.082	0.179	1.612	6.027	***0.000***

Collinearity Diagnostics

Model	Dimen-sion	Eigen-value	Condition Index
1	1	5.650	1.000
	2	0.647	2.956
	3	0.556	3.187
	4	0.076	8.643
	5	0.037	12.305
	6	0.022	15.890
	7	0.011	22.343

Variance Proportions

(Constant)	CEO-INNOV	CEO-KNOW	BUS-SIZE	PERF-EXP	EFF-EXP	SOC-INFL
0.001	0.002	0.001	0.007	0.001	0.001	0.001
0.002	0.017	0.003	0.157	0.009	0.010	0.008
0.004	0.020	0.002	0.585	0.000	0.001	0.001
0.330	0.271	0.002	0.004	0.002	0.076	0.000
0.004	0.162	0.051	0.045	0.035	0.636	0.219
0.191	0.017	0.117	0.006	0.696	0.169	0.237
0.467	0.511	0.825	0.196	0.256	0.106	0.535

These relationships were further examined by using discriminant analysis to see if the scale values could predict whether or not firms had a high, medium, or low behavioural intensity to adopt the next level of e-commerce technology. The

suitability of using discriminant analysis could not be determined for the dataset because the Box's M test was inconclusive. Two of the three levels of the dependent variable had only three cases each, making it impossible to compute the ranks required to compute Box's M. Therefore, the overall reliability of the analysis could not be demonstrated. A larger sample size would very likely eliminate this problem. However, failure to use Box's M does not mean that the discriminant analysis is not useful.

The discriminant analysis resulted in two functions to split between the three behavioural intensity levels in adopting IT (low, medium, and high). However, only the first function was statistically significant. The resulting discriminant equation (Function 1) is:

Group membership (low, medium, high behavioural intensity to adopt) = 1.139(CEO Innovativeness) – 1.178(CEO Knowledge) + 6.358(Performance expectations) – 1.959(Effort expectations) + 0.758(Business size) – 4.852 (Social influence).

Group membership based on the computed discriminant scores had group centroids of 1.533 (low level), -3.992 (medium level), and –6.227 (high level).

A classification of cases based on the discriminant analysis was conducted, using a bootstrapping method based on actual prior probability for group membership. The results revealed that 96.2% of all cases were correctly classified. The results are summarized in Table D.29.

Table D.29: Discriminant Analysis of Factor Scales and Business Size by Behavioural Intention to Adopt e-commerce

Log Determinants

Behavioural Intensity to Adopt e-commerce (Grouped)	Rank	Log Determinant
Low level	6	18.236
Medium level	.	.
High level	.	.
Pooled within-groups	6	17.823

The ranks and natural logarithms of determinants printed are those of the group covariance matrices. Rank < 3, too few cases to be non-singular. Box's M cannot be calculated.

Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	9.179	95.106	95.106	0.950
2	0.472	4.894	100.000	0.566

First 2 canonical discriminant functions were used in the analysis.

Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	0.067	55.498	12.000	***0.000***
2	0.679	7.931	5.000	0.160

No significant functions from .000 to .050

Standardized Canonical Function Discriminant Coefficients

Behavioural Intensity to Adopt e-commerce (Grouped)	Function 1	Function 2
CEOINNOV	1.139	1.708
CEOKNOW	-1.178	-1.698
PERFEXP	6.358	-0.359
EFFEXP	-1.959	1.184
BUSSIZE	0.758	0.124
SOCINFL	-4.852	-0.711

Structure Matrix

Behavioural Intensity to Adopt e-commerce (Grouped)	Function 1	Function 2
CEOINNOV	***-0.296***	-0.130
CEOKNOW	***-0.282***	0.018
PERFEXP	***0.039***	0.447
EFFEXP	***-0.157***	-0.164
BUSSIZE	***-0.047***	-0.160
SOCINFL	***-0.003***	-0.049

Functions at Group Centroids

Behavioural Intensity to Adopt e-commerce (Grouped)	Function 1	Function 2
Low level	***1.533***	0.067
Medium level	***-3.992***	-1.544
High level	***-6.227***	1.099

Prior Probabilities for Groups

Behavioural Intention to Adopt-commerce (Intensity-Grouped)	Prior	Cases Used in Analysis	
		Unweighted	Weighted
Low Level	0.769	20	20
Medium Level	0.115	3	3
High Level	0.115	3	3
Total	1.000	26	26

Classification Results[1]			Predicted Group Membership			Total
	Behavioural Intention to Adopt e-commerce (Intensity- Grouped)		Low Level	Med Level	High Level	
Original	Count	Low Level	20	0	0	20

		Medium Level	0	3	0	3
		High Level	0	0	3	3
	%	Low Level	100	0	0	100
		Medium Level	0	100	0	100
		High Level	0	0	100	100
Cross-validated	Count	Low Level	19	1	0	20
		Medium Level	0	3	0	3
		High Level	0	0	3	3
	%	Low Level	95	5	0	100
		Medium Level	0	100	0	100
		High Level	0	0	100	100

[1]96.2% of cross-validated cases correctly classified.