Critical Success Factors for Service-Oriented Small Businesses In the E-Commerce Environment

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A dissertation submitted in partial fulfillment of the requirements
For the degree of Doctor of Philosophy
In
Information Systems

Graduate School of Computer and Information Sciences
Nova Southeastern University

2008

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Graduate School of Computer and Information Sciences
Nova Southeastern University

2008

An Abstract of a Dissertation Submitted to Nova Southeastern University
In Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

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April 2008

Adoption and use of ecommerce by small businesses is generally understood to be rather slow, though the reasons are unclear. In this research, the factors (called critical success factors) affecting the adoption and continued use of e-commerce technologies are studied. Three well known theoretical frameworks and views from strategy literature have traditionally provided theoretical reasons for identifying factors a small business would use to successfully employ e-commerce technologies in their organization, viz., the technology-organization-environment (TOE) framework, the chain of causality (C of C) and the resource-based view (RBV).

In this study, a model called the critical success factors model, was developed to study adoption and use of e-commerce technologies by service-oriented small businesses. The model utilizes factors identified by the three established frameworks and contextualized them to small business and e-commerce. The model is empirically tested using data collected from (146) small business firms.

Analyses and results suggest that the employee's computer expertise, the decision maker's ability and willingness to innovate, and the degree to which ecommerce technologies integrate with existing infrastructure significantly affect the longevity of system use. Therefore it is suggested that a manager (small business owner) planning an e-commerce system should try to be innovative in the use of e-commerce applications and technologies in their organization, hire skilled people to handle their e-commerce systems, and carefully analyze the benefits versus the costs of integrating e-commerce systems with existing infrastructure.

Acknowledgments

First I would like to acknowledge and thank my advisor, Dr. Easwar Nyshadham and the other members of my dissertation committee, Dr. Littman and Dr. Mukherjee for their patience and invaluable input to this project. I also wish to acknowledge the statistical tutoring help of Dr. Said Bahi from Southern Utah University, and others who have so willingly proofread rough drafts.

Most importantly I express my love and gratitude for my wife, Debbie, and our children (Jeremy, Kayla, Alyssa, Bryson, and Rylee) for their enduring love and support throughout my schooling, without which this would not have been possible. I also want to express my gratitude and love for my Mother and Father and for their strength and support. Even though my Father passed away prior to the completion of my schooling his love and support have been felt throughout. Finally, I would be ungrateful if I did not acknowledge my Lord and Savior, Jesus Christ, for his strength and support. Thank you!

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Chapter 1

Introduction

Setting the Stage

The following section outlines the context of the current research in e-commerce; the problem and goals of this research; the relevance and significance of the current research; and the barriers and other issues that face this research.

Over the past several years, there has been a shift in the economic structure of businesses from traditional methods of doing business to e-commerce (EC) or the method of doing business over the Internet (McGann, King, & Lyytinen, 2002). This shift has presented several challenges for service-oriented small businesses (SOSBs). SOSBs are a sub-group of small businesses and are the target of this research. Small businesses (SBs) referred to in existing literature may have addressed SBs but not the target group of this research, SOSBs. Petkov, Petkova, Fry, and D'Onofrio (2003) mention that in-house technical abilities of SBs may be such that they are unable to take advantage of the new technologies that could put their business processes online. Petkov et al. also support the idea that in order for SBs to take advantage of new technologies and successfully compete in the new economic structure, there is a need to identify specific factors that will contribute to the firm's success in EC (Sung & Gibson, 2005).

In order to benefit SOSBs in these challenges, critical success factors (CSFs) are defined and identified in the context of e-commerce (Petkov et al., 2003). E-commerce is defined so that SOSBs understand what this new economic structure is. Rockart (1979) defines critical success factors (CSFs) as "the limited number of areas in which results, if

they are satisfactory, will ensure successful competitive performance for the organization" (p. 85).

Petkov et al. (2003) slightly modify the Rockart definition of CSFs: "Critical success factors can be defined as a small number of easily identifiable operational goals shaped by the industry, the firm, the manager, and the broader environment that are believed to ensure the success of an organization" (p. 768). This research adopts the current definition of Petkov et al. in order to maintain consistency and stability with current literature.

EC is defined as "the process of buying, selling, transferring, or exchanging products, services, and/or information via computer networks, including the Internet" (Turban, King, Lee, & Viehland, 2004, p. 3). E-business as defined by Turban et al. "refers to a broader definition of EC, not just the buying and selling of goods and services, but also servicing customers, collaborating with business partners, conducting e-learning, and conducting electronic transactions within an organization" (p. 3).

Because e-commerce has and continues to significantly transform the way business is conducted (Subramani & Walden, 2000; Tabor, 1997), research centering on developing e-commerce strategies and identifying critical factors for SOSBs can provide SOSBs with a way to maintain a competitive advantage in their respective industries and improve their chances of success in transitioning to EC (Zhu, Xu, & Dedrick, 2003). Eighty-one percent of firms in the U.S. are categorized as SBs (less than 100 employees) by the U.S. Census Bureau (2004). The number of firms in the small business category makes small business an important area for research.

Gribbins and King (2002) state, "It is important that researchers identify and evaluate the e-commerce strategies small business owners and managers have accepted into their operations" (p. 671). According to Gribbins and King, SBs require particular attention outside of the context of larger firms. Dean, Brown, and Bamford (1998) also argue in favor of research related to SBs due to their impact on the economy.

There are three frameworks that are dominant in the literature and used to understand business strategy. The Chain of Causality (C of C) by Porter (1991) strives to establish a cause and effect link between a firm's competitive advantage and the factor(s) that have given the firm their competitive advantage. The Technology, Organization, Environment (TOE) framework by Tornatzky and Fleischer (1990) provides several factors in each category of the framework. Finally, the focus of the Resource-based View (RBV) is on the specific internal resources that an organization has at its disposal and how those resources improve firm performance (Bharadwaj, 2000). These three frameworks are used as the foundation to accomplish the goals in this research.

Problem Statement and Goals

Levy and Powell (2002) point out that SBs are encouraged to enter the EC environment, but the way to do that is not necessarily understood. Levy and Powell also mention that e-business transformation models propose that there is only one path that SBs should follow to incorporate EC into their business, but little evidence that SBs actually follow the path. Herein lays the problem, evidence shows that SBs are not utilizing the path set forth by existing models (Levy & Powell). The problem that this research addressed was to discover what factors are used by SOSBs, which play a critical role in the transformation of the traditional SOSB to EC. Sources found in the literature

are in the context of small businesses and do not specifically address service-oriented small businesses (Stansfield & Grant, 2003; Petkov et al., 2003; Gulledge, 2002; Ihlström & Milsson, 2003).

The main research question that is addressed is what factors are critical to the success of SOSBs who engage in e-commerce activities? The purpose of this research was to identify and validate a set of CSFs for service-oriented small businesses that use e-commerce to distribute their services. Established frameworks such as the C of C (Porter, 1991), the TOE (Tornatzky & Fleischer, 1990), and the RBV (Wade & Hulland, 2004) were used to form a theoretical basis for identifying and validating CSFs for the SOSBs in this study.

The overall goals of this research were the following: 1) to use the TOE to identify a comprehensive list of factors; 2) to use the C of C to establish the causal logic of these factors in the context of SOSBs; 3) to use the RBV to qualify a subset of factors identified by the TOE, which are the CSFs that contribute to the success of SOSBs in e-commerce environments; 4) to validate this subset of factors through regression analysis of survey information gathered from SOSBs; and 5) to use the results found in goal four to propose a CSF model that can be used by SOSBs to improve their success in EC.

Relevance and Significance

Researchers and industry professionals believe that EC is transforming and will continue to transform the way business is conducted (Kauffman & Walden, 2001). Models and frameworks have been constructed and success factors discovered in research and include the Technology Adoption Model (TAM) presented by Davis (1989); the TOE framework by Tornatzky and Fleischer (1990); Kim (2000) presents the Success model of

e-business; Porter (1991) presents the Chain of Causality; Bharadwaj (2000) and Wade and Hulland (2004) present the RBV; and Tan, Nah and Iacovou (2003) present an E-marketplace adoption model that maps to the TOE framework.

The overall significance of the current research is to provide additional awareness and education concerning the factors that are critical to success for SOSBs as they strive to compete within the EC world.

Barriers and Issues

The TOE, C of C and RBV frameworks have been established in the literature. There are an enormous number of factors, within these frameworks, that go into the execution and success of businesses in the EC environment. Little consensus in the literature about which factors are critical is one reason that a study of this sort has not been successful in bringing to light the specific factors most critical to EC strategies in SBs (Levy & Powell, 2002).

There are many SBs in the United States (U.S. Census Bureau, 2005). The scope of this research targeted specific SBs that provide service-oriented products and services and that have a web presence. A barrier in this research was finding SOSBs that are willing to participate in the study. Initial research efforts led to local chambers of commerce that have listings of registered businesses, along with accompanying contact information. Based on these efforts the barrier to finding participants was overcome and participants were found. No surveys were administered until approval was received by the necessary IRBs.

Petkov et al. (2003) and Boyes and Irani (2003) support the fact that many studies have been done in EC, but few have focused on SOSBs. Due to the overall impact of SBs on

the economy, this area of research can provide help to SOSBs who endeavor to engage in EC (Gribbins & King, 2002; Dean et al., 1998).

Elements, Hypotheses, and Theories

There are three independent variables that stand out in the literature as critical to success in EC. Organizational Readiness (OR) is the state of preparation within the organization to adopt an EC strategy (Levy, Powell, & Worrall, 2004; Beckinsale & Levy, 2004). Perception of usefulness (PB) (Perceived Benefits by decision-maker) specifies the decision-maker's belief that adoption of EC technologies and strategies will provide profitable benefits to the organization (Levy et al., 2004; Beckinsale & Levy, 2004). External Pressure (EP) (relationship to business partners and pressure) is the pressure that SBs receive from business partners to adopt EC technologies (Levy et al., 2004; Beckinsale & Levy, 2004). These factors were tested, through regression analysis, to determine how they work together to achieve success in EC. Table 1 summarizes the proposed relationships among technological, organizational, and environmental factors listed above.

Based on the definition of E-Commerce used in this research, success is defined as the sustained successful completion of business transactions using computer network and Internet technologies (Turban et al., 2004).

Table 1. Summary of the Relationship among Technology, Organization, and Environment factors

Relationship	Contributions	E-Commerce Success
PB/OR/EP	PB is high and at least one other factor is High.	Yes
	PB is low and at least one other factor is Low.	No
	PB is low and OR and EP factors are high.	Yes

Information in Table 1 is organized into propositions that allow the current research to measure and validate or invalidate the relationship among these factors through the use of the established frameworks.

P_1: High Perceived Benefits of Technology and either high Organizational Readiness or high External Pressure will have a positive effect on e-commerce success.

P_2: Low Perceived Benefits of Technology and either low Organizational Readiness or low External Pressure will have a negative effect on e-commerce success.

P_3: Low Perceived Benefits of Technology and both high Organizational Readiness and high External Pressure will have a positive effect on e-commerce success.

Summary

The problem has been outlined that is addressed by this research. Goals have been set, propositions listed, and the scope of the research illustrated. The significance of this research is to increase awareness and education for SOSBs in relation to critical factors that will help them make educated decisions when constructing an e-commerce strategy. Barriers and issues associated with this research have also been listed with accompanying solutions to those barriers.

Chapter 2

Review of the Literature

Scope of Research

Figure 1 illustrates the scope of this research. A review of the literature provides an explanation and perspective of the diagram in Figure 1.

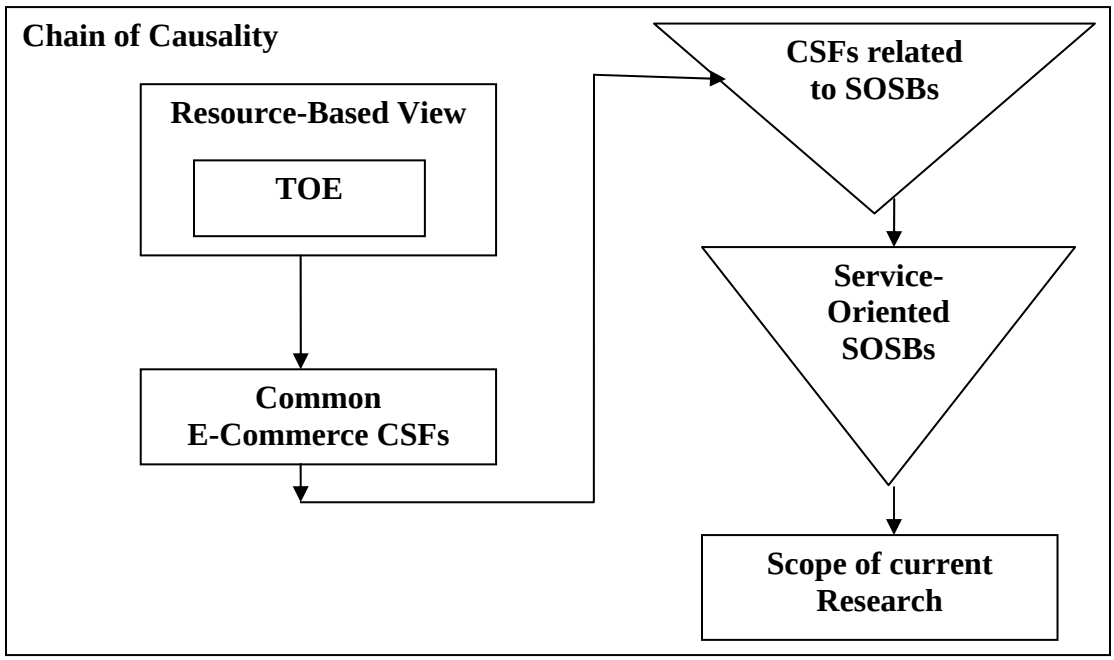


Figure 1: Scope of research

The above diagram helps give perspective to the current research. The diagram shows that the chain of causality (Porter, 1991) permeates the whole of this research. Figure 1 establishes the process this research followed to narrow the many factors that go into the decision and implementation of EC technologies and strategies in SOSBs. The result of using the chain of causality is a subset of critical factors that should be present when a service-oriented small business has the desire to enter the EC world. Within this

logical framework, the TOE framework and the RBV work together to identify the most common factors that fit within the scope of this research.

Porter (1991) states that:

> Causes of superior firm performance at a given point in time…can be framed as a chain of causality…. A body of theory which links firm characteristics to market outcomes must provide the foundation for any fully dynamic theory of strategy. Otherwise, dynamic processes that result in superior performance cannot be discriminated from those that create market positions or company skills that are worthless (p. 96).

Therefore, in order to expand a company's strategy into EC, there must be a link between the successes the company experiences in the market and the assets and capabilities (Wade & Hulland, 2004) of that company. The C of C helped provide this link within the current research.

Chain of Causality

The following list contains directions of thought based on Porter's (1991) dynamic strategic theory and the chain of causality. Some additional notes are included by the current author to associate these factors with the current research project. Based on the C of C organizations must address the following items or factors in order to gain competitive advantage in their industry and, in turn, succeed in EC:

- The strategy must deal with the firm, the industry, and the environment simultaneously.
- The firm must allow for exogenous change, or change that occurs or originates in the industry or environment in which the firm operates.

- The strategy must allow enough latitude for the firm to choose established options in the industry, as well as create new options.
- The strategy must be flexible enough that the firm can learn from its environment and industry and be able to adapt to the ever changing environment.
- Capacity for learning and adaptation must be fostered in the firm.
- Ability to make good strategic choices and implement those choices.
    - Why are some firms better at this than others? This question is beyond the scope of the current research but would be an area of further research.
- Proximate environment in which a firm is based.
    - This factor lends itself to the firm's ability to accumulate the resources and skills necessary to implement strategic choices and gain advantage in their industry. That is if the firm is based in an area that has an abundance of the resources and skills they need.
    - This factor can be applied to EC firms that are looking to hire talent in areas they need in order to implement an EC strategy. The cost of recruiting local talent is much lower than nationwide searches for talent. If the pool of local talent is dry or very limited, the cost of acquiring the skills that would enable the implementation of the strategy will be much higher. Hence, the local environment where the firm is based can be a source of advantage.
- Environmental factors relating to innovation and upgrading of strategies:
        - Firm strategy, structure, and rivalry
        - Related and supporting industries

- Factor conditions
- Demand conditions

Table 2. Factors derived from Porter's Chain of Causality

Category	Factors
Firm	- Latitude to choose well-defined options, or create new ones - Capacity to learn and adapt - Ability to make good strategy choices and implement those choices
Industry	- Allow for exogenous change - Changes in technology - Changes in buyer behavior
Environment	- Proximate environment in which firm is based - Government - Relating to innovation and upgrading: - Firm strategy, structure, and rivalry - Related and supporting industries - Factor conditions - Demand conditions

Table 2 outlines the categories and associated factors that a firm needs to consider, according to Porter. The C of C is not so much a model or framework, but rather the process used to determine the origins of success or competitive advantage that a firm experiences. The chain of causality is used to ask the difficult questions in order to get to the foundation of why, how, what, or where the competitive advantage, and in turn success, is derived. The "chain" infers that there is a cause and effect process that ultimately enables a firm to succeed in their industry of choice.

For example, why does a particular resource provide competitive advantage? Is the acquisition of a resource an outcome of a decision or strategy or the cause of the advantage? How does the resource provide an advantage? Is there a policy in the firm

that contributes to the use of the resource in a way that gives advantage? Is there some change in the industry that promotes the resource to an advantage for the firm? These are only some of the questions that can be asked to help determine what factors contribute to success in a firm.

As the current research progressed, the C of C helped maintain a healthy level of question-asking that contributed to filtering out factors that are outcomes of success rather than the cause of the success. This is the role that the C of C had in the current research.

Resource-Based View

The Resource-Based View (RBV) of strategy has become the dominant view with respect to firm performance, strategic planning, and the competitive advantage that firms experience in their respective industries (Rouse & Daellenbach, 1999; Gribbins & King, 2002; Bharadwaj, 2000). The RBV works with the chain of causality (Porter, 1991) to identify the resources of a firm that directly affect a company's competitive advantage within their market.

Wade and Hulland (2004) in their review of the RBV define resources "as assets and capabilities that are available and useful in detecting and responding to market opportunities or threats" (p. 109). The question to ask, then, is what are assets and capabilities? Wade and Hulland also provide a definition of assets and capabilities. "Assets are defined as anything tangible or intangible the firm can use in its processes for creating, producing, and/or offering its products….Capabilities are repeatable patterns of actions in the use of assets to create, produce, and/or offer products to a market" (p. 109).

The next question is, what are the characteristics of these assets and capabilities that cause them to contribute to the competitive advantage of a firm?

The RBV proposes "that firms compete on the basis of 'unique' corporate resources that are valuable, rare, difficult to imitate, and non-substitutable by other resources" (Bharadwaj, 2000, p. 170-171). These characteristics are what were used in this research to help identify the resources that contribute to competitive advantage and the success of a firm.

The RBV also stands out from other frameworks used in this research by providing the link between the critical success factor and the sustained competitive advantage that a firm can enjoy, where the TOE simply provides a list of factors and the C of C provides a snapshot view of a firm's performance based on a given factor.

Categories identified in the RBV include tangible, intangible, and personnel-based. Table 3 gives examples of resources that fall into each of the RBV categories.

Table 3. Resource-Based View Categories

Category	Resource
Tangible	Physical resources include: - Financial capital - Equipment - Raw materials - Plant - Network infrastructure - Network applications
Intangible	- Reputation - Brand Image - Product quality
Personnel-Based	- Technical Know-How - Company culture - Loyalty - Employee training

A link can be made in each of the categories of the RBV. In the tangible category is the physical equipment that allows the SOSB to provide their services online. This includes the back-end server that contains the database, web content, web server, and security measures needed to provide complete transactions online, and the gathering and protection of customer information.

The intangible category resources of reputation, brand image, and product quality must be built over time. If the company has been around for any number of years, these intangible resources have had time to develop to the point that when the company places their services online, customers recognize the brand, reputation, and quality, and the company is more likely to succeed in EC.

The tangible and intangible resources will do no good without the personnel-based resources. Company culture and employee loyalty set the stage for developing solid personnel resources. The company that does not employ the personnel who have the technical know-how to manage the tangible resources that drive the EC site, hampers their chances of success by this deficiency. This is part of what the current research strives to validate.

The RBV presents a framework in which certain factors are validated and some that are less important in the overall strategy. Table 3 shows some specific factors that were included in this research. The three areas of the RBV, tangible, intangible, and personnel-based, have been incorporated into the TOE framework in this research. The TOE framework is outlined below. Ettlie and Ward (1997) and Bharadwaj (2000) provide four attributes that a resource must have in order to contribute to competitive advantage:

1) the resource must be valuable; 2) the resource must be rare; 3) the resource cannot be imitable; and 4) there are no viable substitutes for the resource.

Technology, Organization, Environment Framework

The TOE framework provides three contexts that influence a firm's adoption of technology and identifies factors that fall within each of the following contexts: technological, organizational, and environmental (Zhu et al., 2003). Zhu et al. go further in describing these different contexts and include both internal and external technologies that are relevant to the organization within the technological context, inclusive of the RBV tangible resources. Organizational context includes the size, structure, quality of human resources, and the formalization of strategy within the organization; inclusive of the RBV personnel-based resources. The environmental context deals with external forces within the specific industry of the organization, inclusive of the RBV intangible resources.

The TOE framework outlines three categories that influence the decision-making process in a firm: technological, organizational, and environmental (Tornatzky & Fleischer, 1991). These categories provide an umbrella in which to identify factors that contribute to the success of the firm. Table 4 brings together factors that are founded on the TOE framework (Tornatzky & Fleischer; Tan et al., 2003; Zhu et al., 2003).

Table 4: TOE Framework

Category	Factor
Technology	- Technology integration - Infrastructure - Perceived benefits of adoption - Compatibility with current business practices - Complexity of doing business through EMP
Organization	- Financial resources - Firm size - Firm scope - Organizational readiness - Decision-maker's innovativeness and IT knowledge
Environment	- Competition intensity - Regulatory environment - Relationship with business partners (dependency, power) - External persuasion, market structure, other firms' collective actions

Much like the RBV framework, the TOE framework outlines three categories in which factors are identified and related to one another that allow the firm to gain competitive advantage and experience success in their industry.

For example, a SOSB that is in the market of providing full information technology management services or accounting services can utilize this framework to identify areas they can focus on when providing their services. The category of technology helps the SOSB identify how the specific technology will benefit the firm, how technology will function with other products already in use, and how technology can address or enhance specific business processes. As the firm seeks to answer these questions, they must also look internally at how the organization is structured, financed, and how the attitudes of executives might affect the adoption of new technologies. Finally, the firm must also look at how the industry is implementing the new technologies

and whether competitor firms are moving ahead of the rest of the industry through the use of new technologies.

The final piece of the TOE addresses the environment in which the SOSB operates, how technology is used by business partners and competitors, and whether the SOSB will be forced into adopting new technologies.

The TOE provided guidance in conjunction with the RBV in categorizing identified factors. Once these factors were identified through the frameworks, they were processed through a series of filters to assess usefulness within the scope of the current research. The filters included two phases of questionnaires administered to SOSBs to narrow and validate/invalidate the identified factors.

Additional Literature Relating to the Current Research

The following models appear in the literature and are based on the TOE framework to identify factors relating to EC performance. The Technology Adoption Model (Davis, 1989), the EDI Adoption Model (Iacovou, Benbasat, & Dexter, 1995), the Discontinuity Model (Kim, 2000), the e-CAM Model (Lee et al., 2001), the E-commerce Adoption Barrier Model (Love, Irani, Burn, & Themistocleous, 2002), the E-business Value Model (Zhu et al., 2003), and the e-Marketplace Adoption Model (Tan, Nah, Iacovou, & Kim, 2003). Table 5 illustrates some of the factors in the above models.

Table 5. Factors from other Models in the Literature

Model	Factors
E-Commerce Adoption Model (Lee et al., 2001)	- Perceived Ease of use - Perceived Usefulness
EDI Adoption (Iacovou et al., 1995)	- Perceived Benefits - Organizational readiness - External pressure
Discontinuity Model (Kim, 2000)	- Discontinuity of services - Trust - Quality of E-Business - Recovery from failed services
Barriers to Adopting E-Commerce (Love et al., 2002)	- Technical - Financial - Organizational - Behavioral - Risk, knowledge, change, uncertainty

Dean, Brown and Bamford (1998) suggest that "differences in small and large firm resources and capabilities impact the ability to successfully enter certain industry environments" (p. 710). The business environment focus of the current research is EC, and in order to successfully enter this environment Dean et al. (1998) imply that certain resources and company capabilities can directly affect EC success.

Table 6 compares the frameworks and identifies the initial common factors that fit into each category of the utilized frameworks. The categories for the proposed model in the current research and how those categories relate to the established literature are also included in Table 6.

Table 6. Comparison of Frameworks and Identified Items

Framework	Factors
Proposed Framework: Tech. TOE: Tech. CofC: Tech.	- Technology Integration - Infrastructure - Perceived benefits of adoption - Compatibility with current business practices - Network Applications - Network Infrastructure - Exogenous change - Technology change - Changes in buyer behavior
Proposed Framework: Org. TOE: Org. RBV: Tangible CofC: Firm	- Financial resources - Firm size - Firm scope - Organization readiness - Decision-maker's innovativeness and IT knowledge - Financial capital - Equipment - Raw materials - Latitude to choose well-defined options, or create new ones - Capacity to learn and adapt - Ability to make good strategy choices and implement those choices
Proposed Framework: Environ. TOE: Environ. RBV: Intangible CofC: Environ.	- Competition intensity - Regulatory environment - Relationship with business partners - External persuasion, market structure, other firms' collective actions - Reputation - Brand image - Product quality - Proximate environment in which firm is based - Government - Factor conditions - Demand conditions - Relating to innovation and upgrading: - Firm strategy, structure, and rivalry - Related and supporting industries

Other perspectives in the literature that approach the issue of EC from different points of view are mentioned here to lend support to the above list of factors. Magal and Levenburg (2004) look at the issue through motivations for companies to engage in EC. Lee et al. (2001) approach EC adoption from the consumer's point of view. Kim (2000) focuses on the business-to-consumer (B2C) model. Still others approach the question from the business-to-business (B2B) perspective (Medjahed, Benatallah, Bouguettaya, Ngu, & Elmagarmid, 2003; Subramani & Walden, 2000; and Welty & Becerra-Fernandez, 2001).

This review of the literature laid the foundation for the current work. Grounding the current research in the strategic theory of the Resource-Based View and the chain of causality provided focus and laid the groundwork for identifying the critical success factors needed by SOSBs to succeed in the EC world. Coupling this foundation with the technology adoption frameworks and models, enabled the current research to accomplish the goal of identifying critical success factors in model form for SOSBs.

Table 7 defines the variables and measurements used in the tentative Critical Success Factor Model that was tested through the regression analysis of survey data. The proposed model incorporates and organizes the factors that are predicted to surface, as a result of this research, as the critical success factors for EC strategies in SOSBs. After the completion of phase 1 of this research there were some factors that were eliminated.

Table 7. Variable definitions and measurements

Variables	Definition	Measurement
Organization (Independent Variables)		
Readiness	State of preparation in an organization in relation to implementing e-commerce technologies.	5-point Likert scale

Table 7. Variable definitions and measurements

Variables	Definition	Measurement
Financial Capital or Resources	Cash on hand or ability to incur debt to implement EC technologies and strategies.	5-point Likert scale
Decision-maker innovativeness and support	The executive-level support and forward-thinking outlook that management has in relation to implementing e-commerce strategies.	5-point Likert scale
Internal/External IT Knowledge	IT skills available to the organization either internally or externally	5-point Likert scale
Technology (Independent Variables)		
Perception of Usefulness	How the use of technology is viewed by those in the organization.	5-point Likert scale
Compatibility with Business Processes	This variable answers the question of whether a technology improves efficiency of existing business processes or whether those business processes must be modified in order to use a particular technology.	5-point Likert scale
Integration	How the new technology integrates with existing technologies within the organization.	5-point Likert scale
Environment (Exogenous Variables)		
Innovation: Strategy, structure, and rivalry	Determines the dynamics of competition within the industry.	5-point Likert scale
Relationship to Business Partners and pressure	Evaluates the partnerships between the small businesses and the pressure that large business partners place on small businesses to incorporate e-commerce technologies	5-point Likert scale

Table 7. Variable definitions and measurements

Variables	Definition	Measurement
Proximate Environment	The importance of the location of corporate headquarters or offices in relation to hiring local talent. Takes into consideration the cost of hiring local vs. remote talent.	5-point Likert scale
Regulation/Government support	What, if any, government support is available, or what regulations/legislation must be considered in the implementation of e-commerce technologies and strategies?	5-point Likert scale
E-Commerce Success (Dependent Variable)	This is the outcome (dependent variable) based on a combination of the independent variables. This is defined as a positive income resulting from the use of e-commerce strategies and technologies.	Measured as positive or negative

Chapter 3

Methodology

Introduction to Methodology

The overall goals of this research, restated here, were the following: 1) to use the TOE to identify a comprehensive list of factors; 2) to use the C of C to establish the causal logic of these factors in the context of SOSBs; 3) to use the RBV to qualify a subset of factors identified by the TOE, which are the CSFs that contribute to the success of SOSBs in e-commerce environments; 4) to validate this subset of factors through regression analysis of survey information gathered from SOSBs; and 5) to use the results found in goal four to propose a CSF model that can be used by SOSBs to improve their success in EC.

There were two phases used in this research accomplish the above goals and identify the critical success factors for SOSBS in EC. Each phase has similar steps in order to accomplish their goals. The similarity of steps maintains consistency throughout the research, and the organization of this study. The purpose of Phase 1 was to provide the foundational data that would be used to identify the factors that would eventually be included in the final CSF model.

Phase 1 - Sampling, Development of Instruments and Analysis Methods

Phase 1 of this research consisted of the following goals: 1) Establish a pool of participants within the service-oriented small business target group; 2) Create and administer the first of two questionnaires to the pool of participants; 3) Analyze the preliminary data; and 4) Reduce the number of factors that are critical to the success of e-

commerce strategies for SOSBs. These goals were accomplished through the following six steps.

Step 1: Identify participants. This consisted of an initial contact with target small businesses to confirm their willingness to participate in the research.

Step 2: Construct the initial questionnaire. This step built the initial questionnaire with the comprehensive list of factors, identified through the TOE and C of C frameworks.

Step 3: Approval of the questionnaire by the Institutional Review Board.

Step 4: Administer the initial questionnaire, via the Internet, to target SOSBs identified in step 1.

Step 5: Collect the preliminary data in a secure database.

Step 6: Analyze the preliminary data (SPSS 13.0 was used to analyze the data).

The following subsections include a discussion of the target population of participants, the constructs and measures used in the preliminary (Phase 1) study, a discussion regarding reliability and validity of the measures used, and how the data was analyzed throughout this research.

Population and Sampling

The initial population consisted of service-oriented small businesses that have had some aspect of their business online. There was a wide range of how involved the online presence was for each company. Some company's website was there to simply draw new clients with contact information, or advertising; while other company's websites were central to the business processes and transactions. The SOSBs who participated represented a wide range of industries including accounting, web design, technical

services, etc. More than fifty industries were represented in this study; the industries with greater than four percent representation are included in Table 8. These industries represent approximately 81% of the total industries that participated in this research. A complete list of industries is included in Appendix C.

Table 8: Industry Representation

Industry	Frequency	Percent	Cumulative Percent
Accounting	10	6.8%	6.8%
Financial	15	10.3%	17.1%
Food	7	4.8%	21.9%
Healthcare	6	4.1%	26.0%
Insurance	7	4.8%	30.8%
Other	54	37.0%	67.8%
Retail	6	4.1%	71.9%
Technology	13	8.9%	80.8%

The preliminary sample included 34 complete records out of 143 who agreed to participate, which equates to a 24% response rate of those SOSBs that said they would participate. As there was no prior study done on the current target group, the sample size used in this study was deemed sufficient to measure the factors and determine those critical to success in EC for SOSBs. It will also lay the foundation for future research in this area and target population.

Constructs and measures (preliminary)

The initial questionnaire contained a comprehensive list of items relating to e-commerce strategy and was formatted to be delivered over the Internet. The items included in the initial questionnaire were the actual items found in the literature. The format of the initial questionnaire was created specifically for this research since there

was no existing instrument in literature that specifically addresses the research questions in the current project.

Table 9 contains the categories from the TOE framework. These categories are common among the three frameworks used in this research. Hence, due to this commonality the TOE categories are the only ones listed in the table. The items in each category, however, are a compilation from all three frameworks used (ie. TOE, C of C, and RBV).

Table 9 illustrates the mean and standard deviation for all of the items used in the initial questionnaire. The items on the preliminary, and subsequent questionnaire were measured using a 5-point Likert scale. Many of these items were eliminated through the initial questionnaire as not significant to a SOSBs strategy.

Table 9: Item Means and Standard Deviation

Items	Mean (n=34)	Std. Deviation	Std. Error Mean
Technological			
Ease of Use (Davis, 1989)	4.39	.841	.127
Compatibility w/ Business Processes (Tan et al., 2003)	4.27	.872	.132
Perceived Usefulness (Davis, 1989)	4.11	.993	.150
Perceived Benefits (Davis, 1989)	4.09	.910	.137
Technology Integration (Iacovou et al., 1995)	3.98	1.089	.164
Risk of new Technology (Iacovou et al., 1995)	3.89	1.125	.170
Productivity Applications (Davis, 1989)	3.80	1.069	.161
Exogenous Change (Iacovou et al., 1995)	3.64	.967	.146
Existing Network Infrastructure (Iacovou et al., 1995)	3.57	1.301	.196
Organizational			
Decision-maker Innovativeness (Tan et al., 2003)	4.39	.579	.087
Ability to Learn and Adapt (Davis, 1989)	4.34	.781	.108

Table 9: Item Means and Standard Deviation

Items	Mean (n=34)	Std. Deviation	Std. Error Mean
Strategic Choices (Porter, 1991)	4.25	.781	.118
Company Culture (Tan et al., 2003)	4.05	.834	.126
Org. Readiness (Tan et al., 2003)	4.05	.714	.108
Financial Resources (Tan et al., 2003)	4.02	.849	.128
Financial Capital (Tan et al., 2003)	3.95	.888	.134
Latitude to choose well-defined options	3.91	.858	.129
IT Knowledge (Davis, 1989)	3.91	.884	.133
Decision-maker's IT knowledge (Tan et al., 2003)	3.84	.963	.145
Existing Equipment (Iacovou et al., 1995)	3.68	.934	.141
Environmental			
Strategy Inn. (Porter, 1991)	4.07	.818	.123
Factor Cond. (Tan et al., 2003)	4.07	.728	.110
Relationship to Bus. Partners (Tan et al., 2003)	4.00	1.057	.159
Structure Inn. (Porter, 1991)	4.00	.889	.134
Competition (Tan et al., 2003)	3.84	1.098	.166
Supporting Industries (Tan et al., 2003)	3.68	.983	.148
Regulation of Industry (Zhu et al., 2003)	3.64	1.278	.193
External Market Pressure (Tan et al., 2003)	3.55	1.022	.154
Proximate Location (Tan et al., 2003)	2.95	1.238	.187

Reliability and Validity Analysis

There are different ways to establish the stability and consistency of the instruments of measurement. According to Sekaran (2003) stability can be tested through either test-retest or parallel-form reliability. Test-retest administers the same instrument to participants separated by a certain amount of time. Parallel-form provides two different forms that are administered, but measure the same constructs using different wording and

placement of questions. Parallel-form reliability was used in this research. Sekaran also provides two reliability tests for consistency: Interitem consistency and split-half.

Interitem consistency was tested through Cronbach's alpha, which is the established standard for measuring Interitem consistency. Statistics contained 28 items from the initial questionnaire with a cronbach $\alpha = .884$. This alpha falls within the allowable reliability statistics, of .80 or higher, which establishes the goodness of the preliminary data collected.

There are a number of tests that can be used to establish the validity of an instrument. For these tests, this research turns again to Sekaran (2003) who defines three main validity tests: content, criterion-related, and construct validity.

In content validity, each construct has at least one element to measure the construct to ensure valid content. In the current research the preliminary questionnaire was utilized to discover similarities in the items from literature. These similar items were then used in the final questionnaire to measure a single construct.

Criterion-related validity "differentiates individuals on a criterion it is expected to predict." (Sekaran, 2003, p. 206) As individuals are not the target of this study criterion-related validity tests were not used.

Many tests are used to establish the validity of constructs: correlational analysis, factor analysis, and multi-trait analysis. The current research utilized correlational analysis in ascertaining construct validity. The complete results of the correlational analysis is contained in Appendix D.

So, to summarize the establishment of reliability and validity: cronbach's alpha was used to establish Interitem consistency; multiple elements were used in both of the

questionnaires to establish content validity; and correlational analysis was used to establish construct validity. The complete results of these tests are contained in Appendix D.

Analyzing the Data

Since one of the goals of this research is to identify factors that contribute to e-commerce success, the dependent variable was the number of years (yearsonline) that the SOSB has had an online presence. The assumption made here is that if the business continues to operate its online presence, then success has been achieved. Table 18 in Appendix C provides a summary of the number of years SOSBs have been operating online.

Correlational analysis was used in phase 1 to align similar items with appropriate constructs. The statistical software used for this testing was SPSS 13.0. The independent variables in this study consisted of the individual items used on the preliminary questionnaire. Through the correlational analysis, these items were either eliminated, due to insignificance, or incorporated into the constructs used in the final questionnaire. Table 9 above, shows the independent variables used prior to the filtering out of insignificant variables.

Figure 2 reflects the results of the preliminary analysis and the elimination of factors that do not have significant influence on e-commerce success. In the technology category four factors were eliminated, five factors were eliminated in the organizational category, and six factors were eliminated in the environmental category. These factors are identified in Appendix D.

Final independent variables are ordered and prioritized in the next chapter of this paper. By using regression analysis certain factors were eliminated from the second questionnaire, and subsequently from the final proposed CSF model. Regression analysis was used to determine the final results of this study.

The results of the final regression analysis provided the basis for forming the final proposed CSF model. A preliminary CSF model is presented in Figure 2 below. This preliminary model has been modified based on the initial data collected. Some factors were eliminated based on the preliminary data collected. The final proposed CSF model is included in chapter 4: Results.

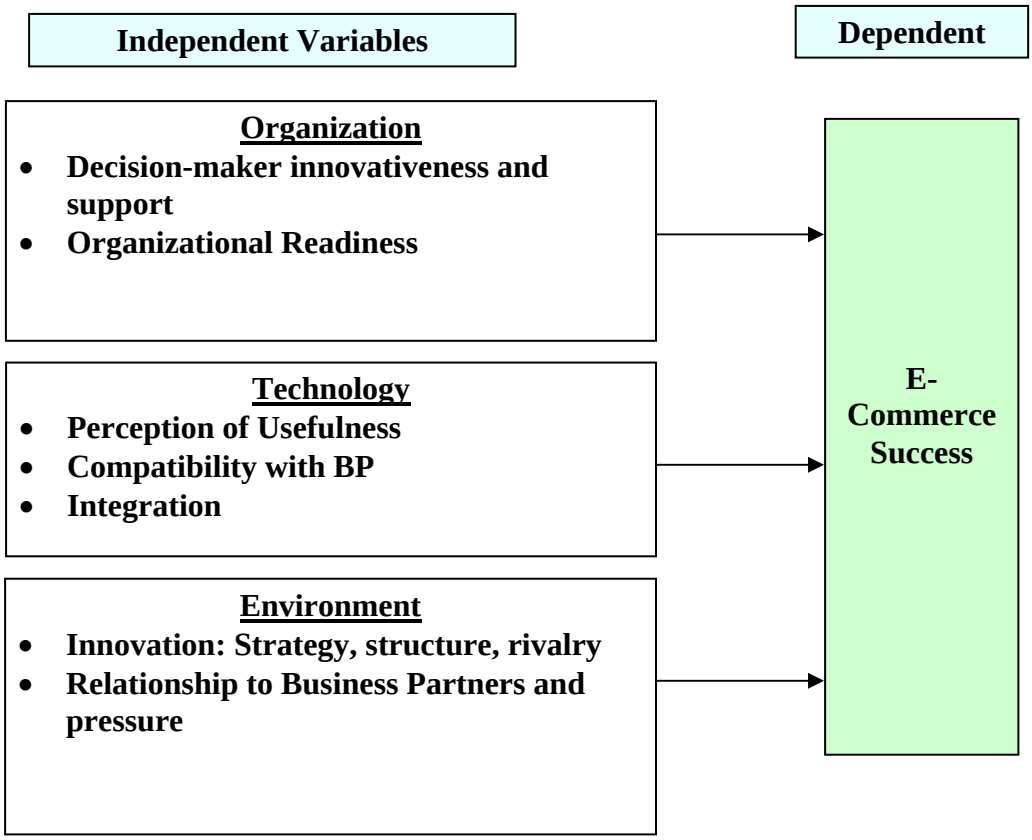


Figure 2: Preliminary Proposed Critical Success Factor (CSF) Model.

Appendix A contains the initial sample questionnaire. This questionnaire was modified and administered online. Constructs and items of the first questionnaire were either included or eliminated in the second questionnaire based on the preliminary findings. Help icons were integrated into the online form to help clarify each item on the surveys administered to the participants.

Phase 2 – Final Data Collection and Analysis Methods

Phase 1 provided the foundation for the constructs that are ultimately part of the final proposed CSF model. Based on the correlational analysis, and preliminary regression analysis, many items were eliminated from the second phase of data collection and the final questionnaire. The elimination of these factors allowed the second phase of the research to focus on the significant factors affecting SOSBs. The remainder of this section outlines phase 2 and the effects of phase 1 on the final constructs and questionnaire.

The remainder of this section outlines the goals of phase 2 and the steps used to achieve those goals. Then a discussion of the final population and sample used in the research followed by an outline of the constructs used in the final questionnaire, and a discussion of the analysis methods used in phase 2 concludes this section.

Phase 2: Goals and Process

Phase 2 in this research included the following goals: 1) Revision of the initial questionnaire based on the analysis of the preliminary data; 2) Identification of preliminary critical factors; and 3) Identification of the final critical success factors for SOSBs in e-commerce. These goals were accomplished through the following steps:

Step 1: Revised the initial questionnaire based on the results of the preliminary data analysis.

Step 2: Initial set of critical factors were used in the revised questionnaire.

Step 3: Identified pool of participants, and administered the revised questionnaire to them.

Step 4: Analyzed the data collected in previous steps of this phase. Again, SPSS 13.0 was used for the analysis.

Step 5: Identified the final set of critical success factors used in the proposed CSF model.

Step 6: Incorporated CSFs identified into a final proposed model for CSFs in E-commerce.

Phase 2: Population and Sample

Pertinent demographic information was collected to ensure that participants meet the target group of SOSBs. Relevant demographic information includes the number of employees, 91% of which have 20 or fewer employees, while the remaining 9% have more than 21 employees. Industry and firm size are the significant variables that determine the target group for this research. Complete demographic data is contained in Appendix C. The additional demographic data contained in Appendix C includes city and state representation, and years the organization has been in operation and online. This data helps to generalize the results of the current research across industries.

The original participants were contacted with the revised questionnaire and additional participants were contacted and included in the final sample. The final sample included a total of 285 participants, 153 of which actually filled out the final

questionnaire. This equates to a 54% response rate on the final questionnaire. As in the initial phase of this research there was no benchmark for a sample relating to the current research target, and therefore this sample was deemed adequate to analyze the factors and produce results significant to the benefit of SOSBs and their e-commerce strategy.

Phase 2: Constructs and Measures

Table 10 below, contains the results of the preliminary data analysis and shows the constructs used in the final questionnaire. The constructs in this table accomplishes the second goal of phase 2 in this research, that of identifying preliminary critical success factors. The following discussion of each construct from the table outlines the revisions made for the final questionnaire, including the associated elements from table 10.

Table 10: Questionnaire Mapping

Framework	Construct	No. of Questionnaire Elements
TOE – Technology TAM	• Perception of Usefulness	6
	• Compatibility with Business Processes	3
	• Integration	4
TOE – Organization RBV – Tangible and Personnel-based	• Decision-maker innovativeness and support	8
	• Readiness	3
TOE – Environment (C of C)	• Innovation: Strategy, structure, rivalry	5
	• Relationship to Business Partners and pressure	2

The top technological items from the results of phase 1 include: ease of use, compatibility with business processes, perceived usefulness, perceived benefits, and

technical integration. The top organizational items include: organizational readiness, decision-maker's innovativeness, ability to learn and adapt new technologies, ability to make good strategy choices, and company culture. The top environmental items include: competition, relationships with business partners, strategy towards innovation, structure towards innovation, and factor conditions.

The items most important to SOSBs, based on the preliminary findings of phase 1 are: perceived benefits (ease of use, perceived usefulness, and perceived benefits were combined into one factor for the final questionnaire, with multiple items measuring this factor), decision-maker's innovativeness, ability to learn and adapt, compatibility with business processes, and strategic choices. These items were taken and incorporated as the final factors used in the second questionnaire with multiple items measuring each one.

The following constructs are the results of the revisions based on the preliminary data analysis. These constructs are the preliminary factors most important for service-oriented small businesses to have in place relating to their e-commerce strategy. The following defines each construct and outlines questions included on the revised questionnaire for each of these constructs. The question format on the second instrument was based on Davis' (1989) questions. The questions were reworked, from Davis' (1989) instrument to accommodate the current topic. In this way the second instrument is unique to this research and does not utilize existing instruments from literature. Appendix B contains a sample of the revised questionnaire.

Perception of Usefulness (Tornatzky & Fleischer, 1991; Davis, 1989)

Perception of usefulness is defined here as the company's overall outlook on the benefits derived from implementing EC technologies. Items used to measure this

construct include: ease of use of the technology; perceived benefits (How will EC improve ROI, reduce costs, etc?); and perceived usefulness (Will EC allow the company to improve business processes?)

Questionnaire elements for this construct:

- Will EC technologies improve ROI?
- Will EC technologies allow your company to improve business processes?
- Will EC technologies allow employees to improve their job performance?
- Will EC technologies enhance company effectiveness?
- Will EC technologies be useful to the company?
- Will EC technologies increase the company's productivity?

Compatibility with Business Processes (Tornatzky & Fleischer, 1991)

Compatibility with business processes is defined here as the ability to apply business processes through the implementation of EC technologies. In other words, interruption to business processes is minimal to nonexistent during the implementation of the EC technologies. Items that measure this construct include: productivity applications (Do the EC applications improve the efficiency of business processes?); and compatibility with business processes (Will the company have to create new business processes or be able to move forward with existing processes?).

Questionnaire elements for this construct:

- Do EC applications improve the efficiency of business processes?
- Will the company have to create new business processes to incorporate EC technologies?

- Will the company be able to use existing business processes with EC technologies?

Integration (Tornatzky & Fleischer, 1991)

Integration is defined here as the ability of a company to implement the new EC technologies with existing infrastructure. The question that the company will ask is, can our existing infrastructure work with the new EC technologies, if so, how well? If not, what needs to change in order to successfully implement the new technologies? Items that measure this construct include the following: technical integration (will the technology work with existing desktop operating systems?); network infrastructure (will our existing network be able to handle the new technologies?); exogenous change (will changes in the technology that is available play a part in what is implemented?); risk associated with the implementation of new technology (what risks or potential problems can be foreseen with the new technology?).

Questionnaire elements for this construct:

- Will the technology work with existing desktop operating systems?
- Will our existing network be able to handle the new technologies?
- Will changes in available technology play a part in what is implemented?
- Will the risk of implementing new (EC) technologies play a part in its adoption?

Organizational Readiness (Tornatzky & Fleischer, 1991)

Readiness is defined here as the level of preparedness a company has for implementing new technologies. There are three measurements for this construct; organizational readiness (is the company prepared to adopt the necessary technology);

equipment (does the company have equipment that will support the new technologies); and company culture (is the company culture such that new technologies are encouraged and embraced that will improve the business).

Questionnaire elements for this construct:

- Is the company prepared to adopt the necessary technology?
- Does the company have equipment that will support the new technologies?
- Is the company culture such that new technologies are encouraged and embraced that will improve the business?

Decision-maker innovativeness and support (Tornatzky & Fleischer, 1991; Veihland, 2000)

Decision-maker innovativeness and support is defined here as the level of assistance management (in the case of SOSBs this would be the CEO or owner) is willing to give to new ways of doing business. There are four measurements used in this construct: decision maker's innovativeness (how inventive is the CEO/owner in using technology?); decision maker's IT knowledge (how savvy is the CEO/owner on new technologies that can be used in the business?); capacity to learn and adapt (Do employees/management have the ability to learn and adapt new technologies?); and latitude to choose well-defined options or create new ones (does the company culture allow the trial of established technologies or the ability to create new ways of doing business?).

Questionnaire elements for this construct:

- The CEO/owner is inventive in using technology.

- The CEO/owner has current knowledge on new technology that can be used in the company.
- The company culture allows the trial of established or new (EC) technologies.
- Employees have the ability to learn EC technologies.
- Employees have the ability to adapt EC technologies to existing technologies.
- Managers have the ability to learn EC technologies.
- Managers have the ability to adapt EC technologies to existing technologies.
- Management allows the exploration to create new ways of doing business.

Innovation: strategy, structure, and rivalry (Porter, 1996)

Innovation: strategy, structure, and rivalry are defined here as the company's ability to establish ground-breaking business strategies, company structure, and deal with industry competition in original or new ways. There are five measurements to support this construct: competition intensity (traditional competition between companies within the industry); company strategy toward innovation (what is the strategy within the company regarding innovative ways of doing business); company structure toward innovation (does the company structure encourage innovation); environmental factor conditions (available technologies influence innovation within the company).

Questionnaire elements for this construct:

- Traditional competition between companies within the industry requires the implementation of EC technologies.

- Industry structure requires implementation of EC technologies.
- The strategy within the company supports innovative ways of doing business.
- The company structure encourages innovation.
- Available technologies influence innovation within the company.

Relationship to business partners and pressure (Tornatzky & Fleischer, 1991)

Relationship to business partners and pressure is defined here as the external forces that compel the company to implement new technologies. For SOSBs who have large companies as business partners, those partners can play an influential part, or even demand that the SOSB implement a specific type of technology in order to continue doing business with them. The one measurement of this construct is the relationship the SOSB has with business partners and the pressures placed on the SOSB by the business partner to incorporate new technologies.

Questionnaire elements for this construct:

- Business partners require the use of EC technologies.
- The company has flexibility with business partners on what technologies can be used.

Appendix B contains the revised or second questionnaire that was used in this study. Note, that it is also broken down into the three TOE categories, but multiple items are used to measure each of the factors illustrated in Figure 2. Once again, this questionnaire was administered online and supported by a secure database. Both questionnaires (from phase 1 and phase 2) were answered by the participants based on a

5-point Likert scale using 1-strongly disagree, 2-disagree, 3-neutral, 4-agree, and 5-strongly agree.

Phase 2: Analysis Methods

Once again, SPSS 13.0 was used to perform the statistical tests in this research. Correlational analysis tests were run on the elements of the independent variables from phase 2 in order to establish and maintain the relationship of the elements to the independent variable.

Cross tabulation was used to identify relationships, if any, between the independent variables. The results of cross tabulation merely shows the relative importance participants placed on one independent variable in relation to another independent variable.

Cronbach's alpha was used to establish the Interitem consistency of the elements used in the questionnaires. This test determines whether there is consistency of the participant's answers throughout the elements utilized on the questionnaires. Results of this test showed an improvement from the initial questionnaire to the final questionnaire. The results are shown in the next chapter.

Reliability was tested through parallel-form administration of the questionnaires. This type of reliability testing means that two separate questionnaires are administered at different intervals. Each questionnaire measures the same constructs, but in a different order and wording of questions.

Regression analysis was used in the final analysis of the data to establish the relationship, positive or negative, as well as the strength of the relationship between the independent variables and the dependent variable identified in this study. An ANOVA

test was used to determine the significance of the predictor variables on the dependent variable.

The final results of analysis are outlined in the following chapter. Complete tabular results are contained in Appendix D.

Chapter 4

Results

Findings

This chapter completes the goals of phase two, as stated in chapter 3. Tests were run to establish reliability, stability, and consistency of the instrument used. Regression analysis tests were run to provide factors that have significant impact on EC success.

Data was collected through online questionnaires administered to SOSBs in various industries. The initial questionnaire contained a total of 143 companies that agreed to participate. There were 34 of those who actually completed the questionnaire. This initial sample equates to a 24% response rate. The initial service industry representation is contained in Table 11. The other determining factor that identified the target group was the number of employees. Table 12 depicts the distribution of the number of employees in the organizations that participated in the initial questionnaire.

Table 11: Preliminary Industry Representation (N = 34)

Industry	Frequency	Percent	Cumulative Percent
Accounting	3	8.8	8.8
Construction	2	5.9	14.7
Financial	1	2.9	17.6
Food	1	2.9	20.6
Healthcare	2	5.9	26.5
Hospitality	2	5.9	32.4
Insurance	2	5.9	38.2
Other*	16	47.1	85.3
RealEstate	2	5.9	91.2
Retail	1	2.9	94.1
Technology	2	5.9	100.0

*Other industries are listed in Appendix C.

Table 12: Preliminary Employee Distribution

# of Emps	Frequency	Percent	Cumulative Percent
1	7	20.6	20.6
2	1	2.9	23.5
4	1	2.9	26.5
5	4	11.8	38.2
6	3	8.8	47.1
8	1	2.9	50.0
9	1	2.9	52.9
10	1	2.9	55.9
11-15	2	5.9	61.8
16-20	3	8.8	70.6
21+	10	29.4	100.0

The above two tables set the stage for the initial collection of data. Industry and employee representations for the final set of data are contained in Tables 13 and 14 below.

Table 13: Final Industry Representation (N = 146)

Industry	Frequency	Percent	Cumulative Percent
Accounting	10	6.8	6.8
Agriculture	1	.7	7.5
Automobile	1	.7	8.2
Construction	2	1.4	9.6
Consulting	1	.7	10.3
Education	1	.7	11.0
Financial	15	10.3	21.2
Fitness	1	.7	21.9
Food	7	4.8	26.7
Graphic Design	2	1.4	28.1
Healthcare	6	4.1	32.2
Hospitality	2	1.4	33.6
Insurance	7	4.8	38.4
Legal	2	1.4	39.7
Marketing	2	1.4	41.1
Medical	3	2.1	43.2
Other*	55	37.7	80.8
Printing	1	.7	81.5
Real Estate	5	3.4	84.9
Research	1	.7	85.6
Retail	6	4.1	89.7

Staffing	1	.7	90.4
Technology	13	8.9	99.3
Utility	1	.7	100.0

*Other industries are listed in Appendix C.

Table 14: Final Employee Distribution (N = 146)

# of Emps.	Frequency	Percent	Cumulative Percent
1	83	56.8	56.8
2	10	6.8	63.7
3	4	2.7	66.4
4	6	4.1	70.5
5	6	4.1	74.7
6	5	3.4	78.1
8	1	.7	78.8
9	3	2.1	80.8
10	3	2.1	82.9
11-15	8	5.5	88.4
16-20	4	2.7	91.1
21+	13	8.9	100.0

The above tables provide the necessary context for the target businesses used in this research. The majority of businesses contained fewer than 20 employees. Industry representation is such that the results of his research will enable generalization across a divergent set of industries. The final sample included 285 participating companies, 153 who actually responded to the questionnaire. 146 of the 153 are the valid records collected. This gives a 54% response rate for the final collection of data. This exceeded the expected response rate of 40%.

Continuing to provide the context for the data collected, independent and dependent variable descriptive statistics illustrate the range of data collected in the final stage of data collection. Table 15 outlines the range of responses for both the dependent and final independent variables.

Table 15: Dependent and Independent Means (N = 79)

Variable	Mean	Std. Deviation	Minimum	Maximum
readiness3	4.00	.877	2	5
dminn4	3.95	.815	1	5
percuseful2	4.00	.877	1	5
percuseful4	3.94	.882	1	5
integration1	3.75	.854	1	5
Yearsonline (Dependent)	3.91	2.266	1	8 (16-20 years)

Reliability and stability of this research was confirmed through the use of Parallel-Form questionnaires. Interitem consistency was established in this research through Cronbach's Alpha which was .956. The consistency improved from the preliminary questionnaire to the second questionnaire, which adds to the stability of the study. During the regression analysis of factors, the factors associated with the environmental category in the TOE framework were found to have no significant impact on EC success.

A correlational analysis was performed to establish relationships between the independent variables. It was found in this analysis that there is a positive relationship between each of the independent variables. Table 16 summarizes the results of the correlations between these variables. Notice that some relationships are stronger than others. For example percuseful2 (perceived benefits) and percuseful4 (perceived usefulness) have a very strong positive relationship (.807), where the relationship between percuseful2 and integration is much weaker (.440).

On that note, the integration variable has the weakest relationship with all of the other independent variables. Organizational readiness is not far behind integration in its relationship with the other independent variables. Regardless of the strength of the relationship between the independent variables, there is a positive relationship that can be seen from these results.

Table 16: Independent Variable Correlations (N = 146)

	readiness3	dminn4	percuseful2	percuseful4	integration1
readiness3	1				
dminn4	.528(**)	1			
	.000				
percuseful2	.575(**)	.541(**)	1		
	.000	.000			
percuseful4	.546(**)	.518(**)	.807(**)	1	
	.000	.000	.000		
	146	146	146	146	
integration1	.471(**)	.480(**)	.440(**)	.497(**)	1
	.000	.000	.000	.000	

** Pearson Correlation is significant at the 0.01 level (2-tailed).

The above data suggests that all of the independent variables are correlated to some extent. This would suggest that one should check for multicollinearity when estimating the regression model. Table 17 shows, through collinearity analysis that multicollinearity exists, at least prima facie.

Table 17: Multicollinearity Statistics (N=146)

	Collinearity Statistics	
	Tolerance	**VIF**
readiness3	.571	1.752
dminn4	.595	1.682
percuseful2	.313	3.190
percuseful4	.319	3.132
integration1	.659	1.517

Notice that percuseful2 and percuseful4 have high Variance Inflation Factor (VIF) values, indicating the possibility of multicollinearity but not the presence of multicollinearity. In order for multicollinearity to be present the Tolerance must be less than 0.1 which would generate a VIF of 10 or higher. The above table indicates that multicollinearity is not present.

The possibility of multicollinearity and high VIF values indicate the possibility that the unexpected negative coefficient, in the regression analysis, for some of the independent variables can be misleading.

Table 18 illustrates the operationalization of the questions used to measure each of the independent variables in this research. This table establishes the context of the independent variables and the elements used to measure each of the variables.

Table 18: Variable to Questionnaire Item Mapping

Variables	Questionnaire Items Used
Yearsonline (Dependent)	• Yearsonline
Readiness (Organizational Readiness)	• Is the company culture such that new technologies are encouraged and embraced that will improve the business? • Is the company prepared to adopt the necessary technology? • Does the company have equipment that will support the new technologies?
Dminn (Decision-maker's innovativeness)	• Employees have the ability to learn EC technologies? • Employees have the ability to adapt e-commerce technologies to existing technologies? • Managers have the ability to learn e-commerce technologies? • Managers have the ability to adapt e-commerce technologies to existing technologies? • Management allows the exploration to create new ways of doing business? • The CEO/owner is inventive when it comes to using technology? • The CEO/owner has current knowledge on new technology that can be used in the company?
Percuseful2 (Perceived Benefits)	• Will E-Commerce technologies improve ROI? • Will E-Commerce technologies allow your company to improve business processes? • Will E-Commerce technologies allow employees to improve their job performance?
Percuseful4 (Perceived	• Will E-Commerce technologies enhance company

Table 18: Variable to Questionnaire Item Mapping

Variables	Questionnaire Items Used
Usefulness)	effectiveness? • Will E-Commerce technologies be useful to the company? • Will E-Commerce technologies increase the company's productivity?
Integration1 (EC Technologies work with Existing Computer Systems)	• Will the technology work with existing desktop operating systems? • Will our existing network be able to handle the new technologies?

Table 19 summarizes the regression analysis of the five independent variables that were found to have the most significant impact on EC success in this research. The summary in the table reflects an average of the items used to measure each of the independent variables. A discussion of each variable follows Table 19. There is no distinction made between the words variable and factor from this point forward. Appendix D contains the complete statistical analysis. Participant responses that indicated zero years online were filtered out of the regression analysis. The remaining sample size is 78 for the regression analysis summarized in Tables 19 and 20.

Table 19: Regression Analysis of Five Independent Variables (Dependent Variable = Yearsonline)

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
Readiness	.628	.340	.243	1.847	.069
Dminn	.836	.335	.301	2.496	.015
Percuseful2	-1.191	.430	-.461	-2.767	.007
Percuseful4	.900	.439	.350	2.050	.044
Integration1	-.646	.306	-.244	-2.111	.038

R-square of the regression model above is .233. This suggests that 23% of the variance in the dependent variable (yearsonline) is accounted for by these five

independent variables. Given the multicollinearity, the regression analysis was rerun after dropping Percusful4 from the set of independent variables. Results are presented in Table 20 below. The interpretation that follows uses the analysis produced in Table 19.

Table 20: Regression Analysis of Four Independent Variables (Dependent Variable = Yearsonline)

	Unstandardized Coefficients		Standardized Coefficients		
	B	**Std. Error**	**Beta**	**t**	**Sig.**
readiness3	.319	.277	.121	1.151	.252
dminn4	.978	.280	.359	3.490	.001
percuseful2	-.446	.288	-.162	-1.549	.124
integration1	-.651	.272	-.229	-2.392	.018

R-square for the above regression analysis is 0.110. This suggests that 11% of the variance in the dependent variable is accounted for by the above four independent variables. The removal of the Percuseful4 variable reduced the R-square by approximately 12%. The dependent variable is the number of years the organization has been using EC technologies (yearsonline). This variable was used as the measure of success for this research. Table 19 suggests that Dminn, Percuseful2, and Integration1 were significantly related to yearsonline at 0.05 level. However, the signs for percuseful2 and integration1 were opposite from what was expected. Readiness was not significant in explaining the variation in yearsonline at 0.05 level.

The dminn (decision-maker's innovativeness) factor was measured with the following questions and also falls within the organization category of the TOE framework: do employees feel they have the ability to learn EC technologies, do employees feel they have the ability to adapt e-commerce technologies to existing technologies, do managers have the ability to learn e-commerce technologies, do managers have the ability to adapt e-commerce technologies to existing technologies,

does management allow the exploration to create new ways of doing business, is the CEO/owner perceived to be inventive by employees when it comes to using technology, and does the CEO/owner have current knowledge on new technology that can be used in the company. This factor is interpreted as representing executive personnel's readiness and willingness to adopt EC technologies, the employees' ability to adapt to and learn the new technologies. This factor has the expected positive sign and has a significant effect on yearsonline (p=0.001). The coefficient has a value of 0.978, which would suggest that a unit increase in dminn increases yearsonline by 0.978 years.

The variable, Percuseful2 (Improvement of Business Processes, perceived benefits), is not significant (p=0.124) but has an unexpectedly negative sign (-.446). Since the parameter is not statistically significant, the effect of this variable on yearsonline is not interpreted.

The final factor, Integration1 is significant at p=0.018, but again has an unexpected negative sign. The regression equation suggests that a unit increase in integration will reduce yearsonline by 0.651 years. This factor was measured by the following questions: will the technology work with existing desktop operating systems, and will our existing network be able to handle the new technologies? While sample to sample variability might be a cause for these unexpected results, it is also possible that sample selection, instrument quality, choice of yearsonline as a dependent variable, lack of incentives to subjects etc. could potentially explain the unusual data. These unexpected results are discussed in more detail under limitations in Chapter 5.

Given the mixed results, further analyses were conducted. The following analysis dropped percuseful2 and included percuseful4 as an independent variable and the regression results are presented in Table 21 below.

Table 21: Regression with Percuseful4 (Dependent = Yearsonline)

	Unstandardized Coefficients		Standardized Coefficients		
	B	**Std. Error**	**Beta**	**t**	**Sig.**
readiness3	.167	.274	.063	.608	.544
dminn4	.853	.279	.313	3.059	.003
percuseful4	-.008	.285	-.003	-.028	.977
integration1	-.710	.280	-.250	-2.530	.012

This further analysis indicates that the independent variables, readiness3 and percuseful4 are not significant in relation to the dependent variable (yearsonline). R-square for this analysis is 0.095. The significance of the integration1variable did increase in this analysis in relation to the dependent variable. Again, it shows a negative effect on the dependent variable. The regression analyses that were run with alternating independent variables, percuseful2 and percuseful4, suggest that individually their significant effect in relation to the dependent variable is low. Taken together (as in Table 18) their significance improves, but the net effect is still the same. There is a negative effect on the dependent variable.

In a second analysis, the data set was split into two sets based on the number of employees. The assumption is that, in organizations with a small number of employees (e.g., less than or equal to 5), the person leading the IS function may not be a specialist. However, in organizations with a larger number of employees, IS management may be a specialized function and therefore, calls for an expert in IS to administer the company's information technology and EC needs. The number of employees in an organization is

therefore used as a proxy for the expertise of the IS management. It is expected that responses from large organizations will be more discriminating and hence show significant differences. The regression model included a dummy variable called IS_Expert and organizations with less than 5 employees were coded as zero and organizations with more than 5 employees were coded as 1. Apriori, the parameter corresponding to this dummy variable is expected to have a strong effect on the dependent variable (yearsonline) and may possibly interact strongly with some independent variables. Table 22 below contains the pair-wise correlations among independent variables.

Table 22: Pair-wise Correlations Among Independent Variables (Dependent = yearsonline; N=146)

	yearsonline	**readiness3**	**dminn4**	**percuseful4**	**integration1**	**IS_Expert**
yearsonline	1.000	.109	.225	.070	-.071	.569
readiness3	.109	1.000	.528	.546	.471	.041
dminn4	.225	.528	1.000	.518	.480	.149
percuseful4	.070	.546	.518	1.000	.497	.009
integration1	-.071	.471	.480	.497	1.000	-.081
IS_Expert	.569	.041	.149	.009	-.081	1.000

The above correlations indicate that the number of employees is not highly correlated to the other independent variables. However, there is a slight correlation between the IS_Expert independent variable and the dependent variable. Table 23 contains the results of regression analysis of the above dependent and independent variables.

Table 23: Second Regression Analysis (Dependent = Yearsonline; N=146)

	Unstandardized Coefficients		Standardized Coefficients		
	B	**Std. Error**	**Beta**	**t**	**Sig.**
readiness3	.140	.232	.053	.604	.547
dminn4	.495	.240	.182	2.059	.041
percuseful4	.042	.241	.015	.175	.861
integration1	-.420	.240	-.148	-1.752	.082
IS_Expert	3.095	.408	.528	7.583	.000

As indicated in Table 23 the independent variable IS_Expert has a strong effect on the dependent variable, suggesting that the expertise of employees will significantly impact the success of EC in the company. The data in Table 23 also suggests that the independent variables, readiness3 and percuseful4, do not have a significant effect on EC success. Based on these latest results those two variables are not interpreted. R-square for this second analysis is 0.358 when including the IS_Expert variable.

Summary of Results

This summary of results is based on a combination of the first and the second analyses performed. Due to the findings, in the original analysis, that environmental factors do not have any significant impact on EC success within the company, the original propositions could not be fully validated. For P_1, where there is a high perceived benefit in Table 18 (B = -1.191, Sig = .007) of technology and a high organizational readiness (B = .628, Sig = .069), there is a negative effect on the success of EC in the company. This result can be due to the presence of multicollinearity in the variables. Table 24 summarizes the original propositions with their significance and additional comments on the propositions.

Table 24: Proposition Significance

Propositions	Significance	Comments
P_1: High Perceived Benefits (B=-1.191)	.007	P_1 is not verified due to the analysis showing that
High Organizational Readiness (B = .628) or	.069	External Pressure was not found to have a significant
High External Pressure will have a positive effect on e-commerce success.	NA	impact on EC success. The remaining factors will produce a negative impact on EC success, based on the data analysis. Again, multicollinearity may play a part in this result.
P_2: Low Perceived Benefits and	.007	P_2 can be partially verified
Low Organizational Readiness or	.069	based on the data analysis.
Low External Pressure will have a negative effect on EC success.	NA	Again, External Pressure has been deemed insignificant based on the data analysis. If both of the remaining factors are perceived to have low importance, then there will be a negative impact on EC success.
P_3: Low Perceived Benefits of	.007	P_3 can not be verified due to
Technology and both high	.069	the External Pressure factor
Organizational Readiness and high	NA	having no significant
External Pressure will have a positive effect on e-commerce success.		impact on EC success.

P_2 is partially validated in that a low perception of the usefulness of technology and a low level of organizational readiness will still have a negative effect on EC success. P_2 could not be validated using the environmental variables, as they were found too insignificant in their contribution, positive or negative, to EC success.

P_3 could not be validated since the environmental variables were discounted as insignificant in the data analysis. However, the original propositions can be revised based

on the analysis of data in this research. Revised propositions and significance are summarized in Table 25.

Table 25 contains the significance of the variables used in the second analysis with accompanying comments. Perceived benefits (percuseful2) was eliminated and perceived usefulness (percuseful4) is included.

Table 25: Revised Propositions and Significance

Propositions	Significance	Comments
P_1: High Perceived Usefulness (B =.042) and Either high Company Culture (B = .140) or High Ability of employees to learn EC technologies (B =3.095) will have a positive effect on EC success.	.861 .547 .000	Based on the second analysis, P_1 can be validated, in that if either of the second or third factors are low, there will still be a positive effect on EC success. Multicollinearity may play a part in this result. The limitation of this analysis is that the first two factor's significance suggest that their effect on EC success is very minimal.
P_2: Low Perceived Usefulness and Either Low Company Culture or Low Ability of employees to learn EC technologies will have a negative effect on EC success.	.861 .547 .000	P_2 is validated in that if any of the factors are not considered important, then there will be a negative impact on EC success. Again, the limitation of this analysis rests in the significance of each of these factors in relation to EC success.
P_3: Low Perceived Usefulness and Both High Company Culture and High Ability of employees to learn EC technologies will have a positive effect on EC success.	.861 .547 .000	P_3 can be validated in that the combination of factors two and three will counter-balance the low impact of the perceived usefulness factor and produce a positive impact on EC success.

Table 25 reflects a revised set of propositions that were derived from the data analyses. The revised propositions incorporate the factors that were found to be the same or closely related to the original propositions. These factors do not necessarily have the greatest effect on EC success.

The final factors, based on the results presented in Table 23, that were found to provide the most significant impact on EC success are summarized in Table 26. These include the degree to which the new technologies integrate with existing technologies in the organization, the decision-maker's innovativeness, and the IS expertise of employees.

Table 26: Final Factor Mapping

Framework	Factor
TOE – Technology	• Integration with Existing Technologies (Integration1)
TOE – Organization RBV – Tangible and Personnel-based	• Employee ability to Learn EC Technologies (Dminn) • Employee Expertise Proxy (IS_Expert)

The results listed in Table 26 show that technological factors that allow the company to integrate with existing technologies may have a negative (B=-.420) effect on the success of EC. However, if integration is coupled with the employee's ability to learn the new technologies and employees have expertise to use the new technologies improves the company's ability to succeed in EC.

The implications and limitations of these results are discussed further in Chapter 5.

Chapter 5

Conclusion, Synthesis of Results, Implications, Recommendations, and Summary

Conclusions

The overall goals achieved by this research were the following: 1) to use the Technology, Organization, Environment (TOE) framework to identify a comprehensive list of factors; 2) to use the Chain of Causality (C of C) to establish the causal logic of these factors in the context of Service-Oriented Small Businesses (SOSBs); 3) to use the Resource-Based View (RBV) to qualify a subset of factors identified by the TOE, which are the Critical Success Factors (CSFs) that contribute to the success of SOSBs in e-commerce environments; 4) to validate this subset of factors through regression analysis of survey information gathered from SOSBs; and 5) to use the results identified in this research, in goal four, to propose a CSF model.

In accomplishing the first goal, many items associated with the TOE framework were identified through the literature review. The RBV and the C of C also contributed items of possible importance at this stage of the research.

A correlational analysis that substantiated or discounted variable relationships was run to complete the second goal. Tables 16 and 22 from chapter 4 outline part of the correlational analysis among the independent variables. Based on the analysis at the end of chapter 4, one more regression was run using the number of employees as an independent variable instead of the proxy, IS_Expertise variable. The correlational analysis for these variables is in table 27 below. A complete correlational analysis of variables is contained in Appendix D.

Table 27: Correlation of Final CSFs (Dependent=Yearsonline; N=146)

	yearsonline	emps	dminn4	integration1
yearsonline	1.000	.653	.225	-.071
emps	.653	1.000	.138	-.081
dminn4	.225	.138	1.000	.480
integration1	-.071	-.081	.480	1.000

R-square for this regression analysis is 0.454. This suggests that 45% of the effects on EC success (yearsonline) can be attributed to the expertise of employees, the decision-maker's innovativeness, and the degree to which technologies integrate with each other. Table 28 summarizes the actual regression analysis associated with the correlations in Table 27.

Table 28: Regression Analysis of Final CSFs (Dependent=yearsonline; N=146)

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
emps	.340	.035	.616	9.708	.000
dminn4	.532	.197	.195	2.706	.008
integration1	-.326	.204	-.115	-1.601	.112

The RBV and TOE were used to accomplish goal 3 of the research as preliminary data was collected, and the comprehensive list of factors was narrowed to seven constructs used in the final phase of data collection. Within the seven constructs there were 18 total elements used to measure the constructs. Table 29 summarizes the seven constructs (independent variables) and their associated elements. These activities fulfilled goal three, and qualified a subset of factors. The dependent variable (yearsonline) is included for convenience in setting the frame of reference for what is affected by the constructs.

Table 29: Constructs to Elements Mapping

Variables	Questionnaire Items Used
Yearsonline (Dependent)	• Yearsonline
Readiness (Organizational Readiness)	• Is the company culture such that new technologies are encouraged and embraced that will improve the business? • Is the company prepared to adopt the necessary technology? • Does the company have equipment that will support the new technologies?
Dminn (Decision-maker's innovativeness)	• Employees have the ability to learn EC technologies? • Employees have the ability to adapt e-commerce technologies to existing technologies? • Managers have the ability to learn e-commerce technologies? • Managers have the ability to adapt e-commerce technologies to existing technologies? • Management allows the exploration to create new ways of doing business? • The CEO/owner is inventive when it comes to using technology? • The CEO/owner has current knowledge on new technology that can be used in the company?
Percuseful2 (Perceived Benefits)	• Will E-Commerce technologies improve ROI? • Will E-Commerce technologies allow your company to improve business processes? • Will E-Commerce technologies allow employees to improve their job performance?
Percuseful4 (Perceived Usefulness)	• Will E-Commerce technologies enhance company effectiveness? • Will E-Commerce technologies be useful to the company? • Will E-Commerce technologies increase the company's productivity?
Integration1 (EC Technologies work with Existing Computer Systems)	• Will the technology work with existing desktop operating systems? • Will our existing network be able to handle the new technologies?
CompBP (Compatibility	• Do EC applications improve the efficiency of business

Table 29: Constructs to Elements Mapping

Variables	Questionnaire Items Used
with Business Processes)	processes? • Will the company have to create new business processes to incorporate EC technologies? • Will the company be able to use existing business processes with EC technologies?
Innovation: Strategy, structure, and rivalry	• Traditional competition between companies within the industry requires the implementation of EC technologies. • Industry structure requires implementation of EC technologies. • The strategy within the company supports innovative ways of doing business. • The company structure encourages innovation. • Available technologies influence innovation within the company.
Relationship to Business Partners	• Business partners require the use of EC technologies. • The company has flexibility with business partners on what technologies can be used.

Goal four was completed using SPSS 13.0. The regression analyses that were performed and the results displayed in Chapter 4 show that only three constructs have a significant influence on the success of EC in an organization. The three constructs are: the integration of new technologies with old technologies (integration1); the decision-maker's innovativeness (dminn); and the expertise of employees (emps).

The regression analysis shown in Table 28, above does not include two additional variables that were predicted to have an impact on EC success. Table 30 below summarizes a regression analysis that includes the two variables, organizational readiness and perceived usefulness, demonstrating their insignificant effect on EC success.

Table 30: Regression of Final Five CSFs (Dependent=Yearsonline; N=146)

	Unstandardized Coefficients		Standardized Coefficients		
	B	**Std. Error**	**Beta**	**t**	**Sig.**
emps	.341	.035	.618	9.688	.000
readiness3	.162	.213	.061	.759	.449
dminn4	.437	.221	.161	1.980	.050
percuseful4	.078	.222	.029	.354	.724
integration1	-.401	.220	-.141	-1.822	.071

R-square for the above regression is 0.458. The regression analysis shown in Table 30 indicates that organizational readiness and perceived usefulness do not have a significant effect on EC success. A further discussion of these results is presented in the following section.

Synthesis of Results

This section discusses the results of Table 30 and possible reasons for the insignificance of some variables and the significance of others. Explanations will be given for insignificant variables first and then significant variables will be addressed.

One explanation as to why readiness is not significant could be that smaller firms have the ability to move quickly to implement new technologies without a lot of the overhead associated with many decision makers. Therefore, the small firm could be seen as always ready to move in new directions, accounting for the insignificant influence this variable has on EC. These results are consistent with some existing literature (e.g. Viehland, 2000; Koch, 2002; and Petkov et al., 2003), in that organizational readiness has not been included as an important contributor to EC success in small businesses.

However, Iacovou et al. (1995) do include organizational readiness as being important to small firms who are looking to adopt EDI (Electronic Data Integration) systems. Iacovou et al. find that small firms who are lacking the needed resources (e.g.

financial capital, technical expertise, etc.) are less likely to adopt or take on an EDI integration project. Iacovou et al. research is in a different context from EC, and was done in 1995 prior to the explosion of Internet usage by many companies, which could account for the differences in results from the current research.

An explanation that perceived usefulness is insignificant, could be that since there are so few decision makers in the small firm, perceived usefulness in relation to new technologies are taken for granted that they will be valuable in some way. Therefore, decision makers in small firms may approach a project with the benefits and usefulness of the technologies already in mind, it is just a matter of how to implement the technologies so as to reap the benefits or advantages of the new technologies.

Unlike organizational readiness however, perceived usefulness has been found to be a significant factor within other contexts. For instance as on example, Davis (1989) uses perceived usefulness in the context of computer usage. What can be inferred from his results is that if some software is perceived to be useful, then it is more likely to be utilized by employees. The context of Davis' research does not include E-commerce technologies, however the results show that if a computer program or software package is perceived to be useful, then employees are more inclined to use it. Relating the current research to the above example, if E-commerce technologies are perceived to be useful, then a company is more likely to have success with those technologies in the E-commerce world. The results of the actual analysis does not support this particular proposition. One possible explanation has been given for these results. Further research regarding perceived usefulness, in the context of E-commerce technologies, is necessary to determine exact reasons for these results.

The final factors that provide the most significant impact on EC success are: the decision-maker's innovativeness; the employee's expertise; and the ability to integrate the new technologies. Unexpectedly, the regression analysis shows that the ability to integrate new technologies has a negative effect on EC success, when a liberal 10% significance criteria is used. One possible explanation for this negative impact is that new EC technologies are changing at a rapid pace, and if the existing EC technologies integrate with older systems, the life-span of that technology will be reduced. In other words, the company would have to upgrade their existing infrastructure sooner or risk the chance of having to withdraw from the EC environment.

This study suggests that, for SOSBs engaged in EC, the most important variable relating to their success is the decision maker's innovativeness – as a unit increase in innovativeness increases the longevity of the project by 0.437 years. This result is consistent with existing literature; Viehland (2000) includes executive leadership as essential to success in EC strategies. Tan et al. (2003) also include the decision-maker's innovativeness and IT knowledge as important to the successful adoption of EC technologies.

Having a skilled team within the firm follows closely as the next most important contributor to long run success of EC. A unit increase in employees increases yearsonline by 0.341 years. Employee technical expertise is another factor that is found in literature to be of importance in successful EC strategies. Iacovou et al. (1995) embed this factor within their organization readiness. Tan et al. (2003) also include this factor (in the form of IT sophistication) in their organizational readiness factor. The implication of these

results suggest that under other models IT expertise and organizational readiness might have a greater correlation than is portrayed in the results of this research.

Using the above results and analyses, goal five was accomplished by modifying the original proposed CSF model, which is illustrated below in Figure 3.

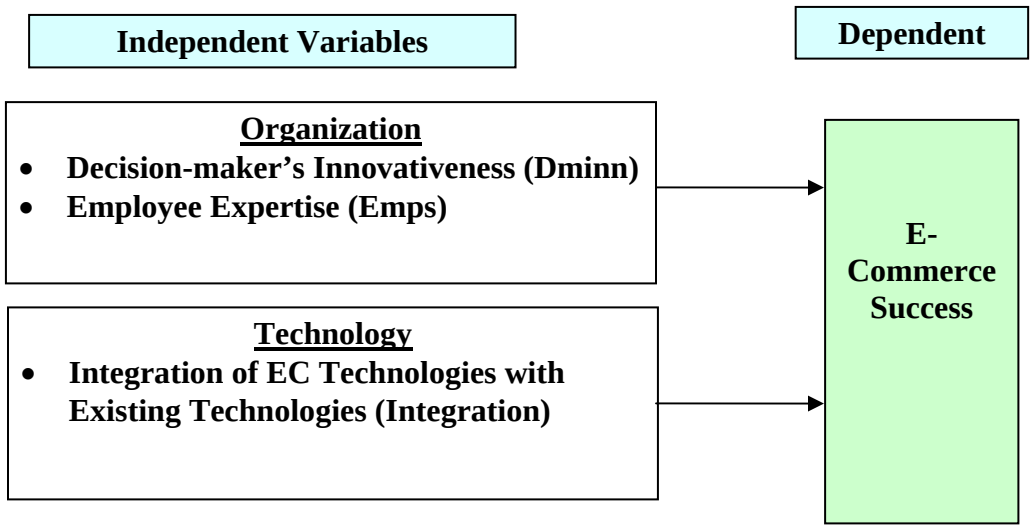


Figure 3: Proposed Critical Success Factor (CSF) Model.

A discussion of the original propositions made at the beginning of the paper were discussed in chapter 4. However, as noted in the last chapter those propositions can be revised based on the results of this study. The revised propositions are rewritten as follows and will be discussed below:

P_1: High Decision-maker's innovativeness and either high Integration or high employee expertise will have a positive effect on EC success.

P_2: Low Decision-maker's innovativeness and either low Integration or low employee expertise will have a negative effect on EC success.

P_3: Low Decision-maker's innovativeness and both high Integration and high employee expertise will have a positive effect on EC success.

P_1 is validated in that all three factors (Decision-maker's innovativeness, Integration, and employee expertise) in the proposition were found to have a significant impact on EC success in SOSBs. During regression analysis (See Table 30) two of the five factors were found to have no significant impact on success (an so are not included in the final propositions), and a third factor (integration) has a negative impact on success. If there is a low emphasis on the factors included in P_2, then the likelihood of success in EC is severely limited, or the organization simply does not engage in EC activities.

Analysis also shows that for P_3 integration and the employee expertise can still enable the company to succeed in the EC environment, even if the decision-maker is not technically inclined to new innovations.

The strength of this study lies in the consistency in which organizations were found to perceive the importance of technology in their individual businesses and that the education of technology is equally important. What is meant here by education is that employees have the ability and are encouraged by the company to learn the EC technologies in order to benefit the company. Education is also used in reference to the employee's expertise in technologies. Additionally, roughly 45% of the variance in EC success can be attributed to the final three factors (decision-maker's innovation, integration, and employee expertise) found to have a significant impact on EC success.

Weaknesses associated with this study include the small sample size of companies willing to participate and the limited significance that these factors have on the traditional organization. See chapter 3 for a discussion of the sample size used in this research.

The unexpected results of earlier regression analyses that show perceived benefits, perceived usefulness and integration of technology having a negative impact on the number of years a business will be online is also considered to be a weakness. Further research into the impact of these factors will be considered. The final regression analysis (See Table 30) shows a positive effect for perceived usefulness, however insignificant its effect on EC success.

The greatest limitation to this study is the fact that many SOSBs still do not engage in EC activities. Many do not have a strategy to incorporate EC technologies into their business, which explains, at least in part, the small sample size willing to participate. The three areas in this study represent critical areas an organization should look at when engaging in EC. There may be other factors that are individually significant to an organization. These additional factors have not been accounted for in the current research.

Implications

The significance of this research to the field of E-Commerce and service-oriented small businesses has been to provide SOSBs with another tool that can be used to construct their strategy toward EC. As SOSBs incorporate the factors of this study, they can increase the success of their EC strategy.

Another significant implication of this research is that the factors identified here provide specific areas where an organization can focus on in their EC strategy. The specific components can help improve the organization's overall strategy in relation to an ever expanding EC world.

In relation to future research, this study provides an avenue that allows researchers to establish more specific areas that can influence the adoption of EC technologies. Open thinking for organizations is encouraged in order to expand their strategy towards EC. EC strategies do not need or rely on financial capital in order to implement some of the factors that contribute to success in EC. The next logical step in the research would be to test the proposed model through a series of case studies. Future research in this area can also identify the impact of individual factors that may comprise the other 55% of an organization's success in EC.

Recommendations

No new research methods were used in this research. There are a number of additional areas of research that can be investigated based on this study. One area of study could discover what technologies could improve business processes. Another area might investigate integration projects and what aspects of the project can lead to a successful implementation of the organization's EC strategy.

The current research showed that perceived usefulness and perceived benefits do not play a significant role in EC success. These results were unexpected and further research can be done to try to explain this result as some anomaly associated with the limited sample size or some other aspect of this research. It is still believed, by this researcher that these two factors do have some role to play in EC success.

The dependent variable, yearsonline, was chosen as the measure of EC success in this research. The reason behind this choice was the assumption that the company is successful in generating enough revenues and receiving enough benefit from their EC presence to continue engaging in that area of their business. Future research could

incorporate financial information (revenues) generated by the organization's EC business unit as a more accurate measure of success. Revenues would enable a more quantifiable analysis of success for the EC aspect of the SOSB's business.

Case studies utilizing the results of this study can also validate or invalidate these findings and directly help SOSBs in their quest to incorporate EC into their overall business strategy. This study did not address reasons that an organization may want to adopt EC technologies and the steps that a company might follow to implement the technologies. Areas such as change management, innovative leadership, or agents of change would fit into further research. These areas of further research expand the ideas presented in this paper and would also serve to benefit not only service-oriented small businesses, but all small businesses.

Summary

This summary provides an overview and condensed version of this paper. Parts of the main paper will be used in this summary, and this section will be distributed to all participants of the study.

Over the past several years, there has been a shift in the economic structure of businesses from traditional methods of doing business to e-commerce (EC) or the method of doing business over the Internet (McGann, King, & Lyytinen, 2002). This shift has presented several challenges for service-oriented small businesses (SOSBs). SOSBs are a sub-group of small businesses and are the target of this research. Small businesses (SBs) referred to in existing literature may have addressed SBs but not the target group of this research, SOSBs. Petkov, Petkova, Fry, and D'Onofrio (2003) mention that in-house technical abilities of SBs may be such that they are unable to take advantage of the new

technologies that could put their business processes online. Petkov et al. (2003) also support the idea that in order for SBs to take advantage of new technologies and successfully compete in the new economic structure, there is a need to identify specific factors that will contribute to the firm's success in EC (Sung & Gibson, 2005).

There is a large amount of literature that discusses small businesses. In that literature there are a number of frameworks and models that are used to help businesses identify areas that will help them improve their strategy toward the adoption of technology and what is necessary in order to successfully implement technology in their business. This research used three frameworks from literature that have been tested and are relevant and valid frameworks for this study. They include the Technology, Organization, Environment (TOE) framework (Tornatzky & Fleischer, 1990); the Chain of Causality (C of C) (Porter, 1991); and the Resource-Based View (RBV) (Wade & Hulland, 2004). These are the frameworks mentioned in the stated goals below.

The current research set out to identify some of these specific factors through the following goals: 1) to use the TOE to identify a comprehensive list of factors; 2) to use the C of C to establish the causal logic of these factors in the context of SOSBs; 3) to use the RBV to qualify a subset of factors identified by the TOE, which are the critical success factors (CSFs) that contribute to the success of SOSBs in e-commerce environments; 4) to validate this subset of factors through regression analysis of survey information gathered from SOSBs; and 5) to use the results identified in this research, in goal four, to propose a CSF model.

The TOE framework identifies a list of factors that are grouped into three categories: technology, organization, and environment. Factors relating to these three

areas, as outlined by Tornatzky & Fleischer, are the areas that a company needs to focus on in regards to their business strategy.

The Chain of Causality (Porter, 1991) is used in the current research to ask questions that help determine a causal relationship between factors and success in e-commerce. The framework helped eliminate factors that were a result of other factors and not the cause of success.

The Resource-Based View (RBV) (Wade & Hulland, 2004) was used to help identify a subset of the factors from the TOE framework. This subset of factors is ultimately what is termed critical success factors (CSFs) for service-oriented small businesses in relation to their e-commerce strategy.

As mentioned before there are a number of models that were found in the literature. The following additional models from the literature are based on the TOE framework which identify factors relating to EC performance. The Technology Adoption Model (Davis, 1989), the EDI Adoption Model (Iacovou, Benbasat, & Dexter, 1995), the Discontinuity Model (Kim, 2000), the E-CAM Model (Lee et al., 2001), the E-Commerce Adoption Barrier Model (Love, Irani, Burn, & Themistocleous, 2002), the E-Business Value Model (Zhu et al., 2003), and the E-Marketplace Adoption Model (Tan, Nah, Iacovou, & Kim, 2003). All of these models tie into one of the three frameworks used in this research, and therefore, were not used as the foundation of the current research.

The three frameworks employed as the foundation for this work were used to identify and validate specific factors that are critical to Service-Oriented Small Businesses and their strategy toward e-commerce. This qualitative study utilized reliability and validity tests to narrow the field of factors and provide a short list of what

is termed here, critical success factors (CSFs). Regression analysis was used to determine the positive or negative impact that these factors have on the success of an organization's e-commerce strategy. Table 31 summarizes the factors and their impact (positive/negative) on the e-commerce strategy.

Table 31: Critical Success Factor Impact

Factor	Impact on E-Commerce Strategy
Decision-maker's innovativeness	Positive
Employee expertise	Positive
Integration with Existing Technologies	(At a 10% significance level) Negative

Based on the results of this study a model was proposed. Initially this model contained seven factors that were thought to have a significant impact on e-commerce strategies. The results of this study found that environmental factors from the TOE do not have a significant impact on the overall success of an e-commerce strategy and were subsequently eliminated from the final model presented here. The final model is repeated in this summary for the benefit of participants.

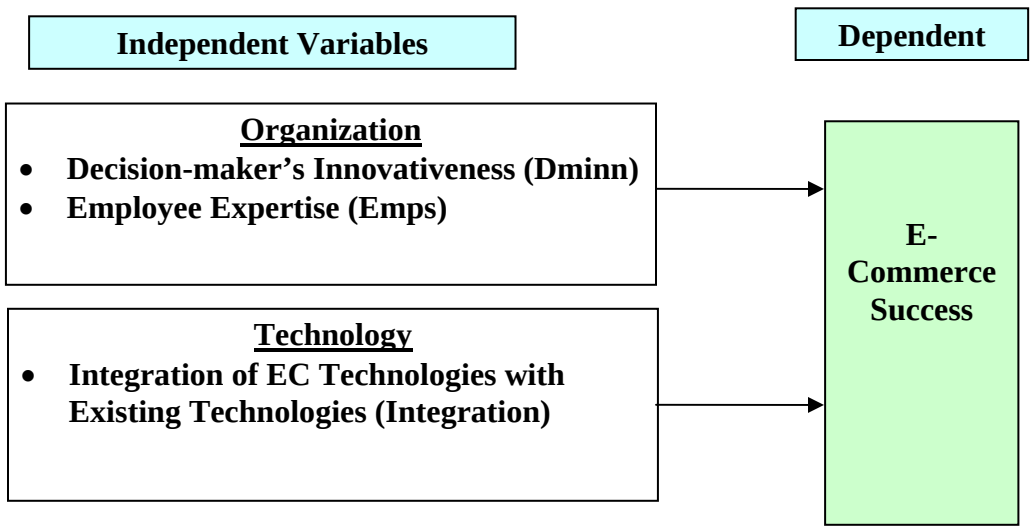


Figure 4: Proposed Critical Success Factor (CSF) Model.

The above figure illustrates the final product of this research. What is shown is that the factors listed below "Organization" and "Technology" are the critical success factors that will enable SOSBs to improve success in implementing an e-commerce strategy.

For the organizational factors, the decision-maker's innovation and the employee's technical expertise can improve the chances of success for the firm in the EC arena. Employees, in this context include not only those directly responsible for implementing the technologies, but also management and executives of the organization.

The factors under the technology category show that integration of EC technologies into existing organizational technologies contribute to EC success. What this means, in terms of implementing the new EC technologies, is that the new technologies have to be perceived to improve company effectiveness, making business processes more efficient. The organization must also be able to integrate the new technologies, as much as is possible, into the technologies that currently exist in the company.

The final recommendations to SOSBs can be summarized in these few short lines. Based on the findings of this research, a manager planning an E-commerce system in a SOSB setting should try to be innovative, hire skilled people to handle their EC systems, and carefully analyze the benefits versus the costs of integrating EC systems with existing infrastructure.

As a final note, if SOSBs will utilize the factors depicted in this research, it is proposed that they can improve the success of their e-commerce strategy. The

implementation of these factors in the organization is beyond the scope of this research, but would be a possible topic of future research on a case study basis.

Appendix A

Sample survey for Phase 1 of this research.

Survey for Service-Oriented Small Businesses

Your participation is greatly appreciated.

You must complete the entire survey in order for your information to be included in the final analysis of this research. There are four pages to this survey once you have entered you ID number below. You must click the "Finish" button on the last page in order for your information to be recorded in the database of responses. **Please read the informed consent section below prior to proceeding.** Thank you for your participation.

Enter your ID number from the E-mail Invitation: [Enter ID Here]

[Submit] [Reset]

Informed Consent:
By entering your ID number above you are consenting to participation in this study.
This study is completely voluntary and you may withdraw at anytime during the survey.
You also consent to the use of the information you provide in the final results of this study.
The information you provide will be used solely for this research project and will not be used for any marketing, or solicitation of services.
You will also be provided with the final results of the research, as a participant.

Survey for Service-Oriented Small Businesses

Your participation is appreciated, page 1 of 4

The following information will be used to generalize the results of the research across multiple industries.

Demographic Information

Number of Employees: [1]

Product or Service provided? [ ]

If you selected Other in the Product or Service window:

Location of Headquarters/Central Office (City):

State or District:

Years of operation:

Years of Online presence:

ID Number: 99999

Continue Reset

Survey for Service-Oriented Small Businesses

Your participation is appreciated, page 2 of 4

Instructions:
There are three areas included in this survey: Technological, Organizational, and Environmental. There are a number of factors in each of these areas, please indicate the importance of the contribution each factor has on your E-commerce strategy using the following 5-point scale. Rank the importance of the factor based on your firm's use of that factor in the implementation of your EC strategy.

1 = Not Important at all, 2 = Not Important, 3 = Somewhat Important, 4 = Important, 5 = Critically Important

---

Technological Factors

Factors	**1**	**2**	**3**	**4**	**5**
Technical Integration (Windows, Mac, Linux)	☐	☐	☐	☐	☐
Network Infrastructure	☐	☐	☐	☐	☐
Productivity Applications	☐	☐	☐	☐	☐
Ease of Use of the technology	☐	☐	☐	☐	☐
Compatibility with business processes	☐	☐	☐	☐	☐
Perceived benefits	☐	☐	☐	☐	☐
Perceived usefulness	☐	☐	☐	☐	☐

Exogenous change	☐	☐	☐	☐	☐
Risk associated with the implementation of new technology	☐	☐	☐	☐	☐

Continue

Survey for Service-Oriented Small Businesses

Your participation is appreciated, page 3 of 4

Instructions:
There are three areas included in this survey: Technological, Organizational, and Environmental. There are a number of factors in each of these areas, please indicate the importance of the contribution each factor has on your E-commerce strategy using the following 5-point scale. Rank the importance of the factor based on your firm's use of that factor in the implementation of your EC strategy.

1 = Not Important at all, 2 = Not Important, 3 = Somewhat Important, 4 = Important, 5 = Critically Important

---

Organzational Factors

Factors	**1**	**2**	**3**	**4**	**5**
Financial resources	☐	☐	☐	☐	☐
Financial capital	☐	☐	☐	☐	☐
Organizational readiness	☐	☐	☐	☐	☐
Decision maker's innovativeness (e.g. CEO, Owner)	☐	☐	☐	☐	☐
Decision maker's IT knowledge (e.g. CEO, Owner)	☐	☐	☐	☐	☐
Existing Equipment	☐	☐	☐	☐	☐
Latitude to choose well-defined options, or create new ones	☐	☐	☐	☐	☐
Capacity to learn and adapt	☐	☐	☐	☐	☐
Ability to make good strategic choices and implement those choices	☐	☐	☐	☐	☐
Current staff's IT knowledge	☐	☐	☐	☐	☐
Company culture	☐	☐	☐	☐	☐

Continue

Survey for Service-Oriented Small Businesses

Your participation is appreciated, page 4 of 4

Instructions:
There are three areas included in this survey: Technological, Organizational, and Environmental. There are a number of factors in each of these areas, please indicate the importance of the contribution each factor has on your E-commerce strategy using the following 5-point scale. Rank the importance of the factor based on your firm's use of that factor in the implementation of your EC strategy.

1 = Not Important at all, 2 = Not Important, 3 = Somewhat Important, 4 = Important, 5 = Critically Important

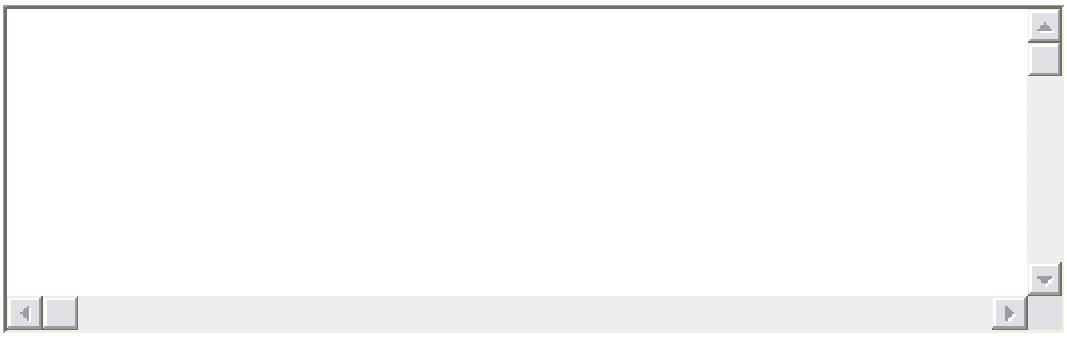
---

Environmental Factors

Factors	**1**	**2**	**3**	**4**	**5**
Competition intensity	☐	☐	☐	☐	☐
Regulatory environment	☐	☐	☐	☐	☐
Relationship with business partners	☐	☐	☐	☐	☐
External persuasion	☐	☐	☐	☐	☐
Location in which the firm is based	☐	☐	☐	☐	☐
Company strategy toward innovation	☐	☐	☐	☐	☐
Company structure toward innovation	☐	☐	☐	☐	☐
Related and supporting industries (Substitution products/services)	☐	☐	☐	☐	☐
Environmental Factor conditions (what technology is available in the industry)	☐	☐	☐	☐	☐

If there are factors that your firm has considered and deem important when implementing an EC strategy, please list them here with a brief description:

Please provide additional comments you feel are relevant and important to your responses on this survey.



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Appendix B

Revised Questionnaire (Phase 2 of Data Collection)

Survey for Service-Oriented Small Businesses

Your participation is greatly appreciated.

You must complete the entire survey in order for your information to be included in the final analysis of this research. There are four pages to this survey once you have entered you ID number below. You must click the "Finish" button on the last page in order for your information to be recorded in the database of responses. **Please read the informed consent section below prior to proceeding.** Thank you for your participation.

Enter your ID number from the E-mail Invitation: Enter ID Here

Submit Reset

Informed Consent:
By entering your ID number above you are consenting to participation in this study.
This study is completely voluntary and you may withdraw at anytime during the survey.
You also consent to the use of the information you provide in the final results of this study.
The information you provide will be used solely for this research project and will not be used for any marketing, or solicitation of services.
You will also be provided with the final results of the research, as a participant.

The following demographic information will be used to generalize the results of the research across multiple industries.

Demographic Information

Number of Employees: 1

Product or Service provided?

If you selected Other in the Product or Service window:

Location of Headquarters/Central Office (City):

State or District:

Years of operation:

Years of Online presence:

ID Number: 99999

Instructions:
There are three areas included in this survey: Technological, Organizational, and Environmental. There are a total of 31 questions in these areas, please indicate the extent to which you agree/disagree with each statement using the following 5-point scale. There is also room at the end to make comments.

1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

---

Technological

Questions	**1**	**2**	**3**	**4**	**5**
1. Will E-Commerce technologies improve ROI.	☐	☐	☐	☐	☐
2. Will E-Commerce technologies allow your company to improve business processes.	☐	☐	☐	☐	☐
3. Will E-Commerce technologies allow employees to improve their job performance.	☐	☐	☐	☐	☐
4. Will E-Commerce technologies enhance company effectiveness.	☐	☐	☐	☐	☐
5. Will E-Commerce technologies be useful to the company.	☐	☐	☐	☐	☐
6. Will E-Commerce technologies increase the company's productivity.	☐	☐	☐	☐	☐
7. Do E-Commerce applications improve the efficiency of business processes.	☐	☐	☐	☐	☐
8. Will the company have to create new business processes to incorporate E-Commerce technologies.	☐	☐	☐	☐	☐
9. Will the company be able to use existing business processes with E-Commerce technologies.	☐	☐	☐	☐	☐
10. Will the technology work with existing desktop operating systems.	☐	☐	☐	☐	☐
11. Will our existing network be able to handle the new technologies.	☐	☐	☐	☐	☐

12. Will changes in available technology play a part in what is implemented.	☐	☐	☐	☐	☐
13. Will the risk of implementing new (EC) technologies play a part in its adoption.	☐	☐	☐	☐	☐

Organzational

Questions	**1**	**2**	**3**	**4**	**5**
1. Is the company prepared to adopt the necessary technology.	☐	☐	☐	☐	☐
2. Does the company have equipment that will support the new technologies.	☐	☐	☐	☐	☐
3. Is the company culture such that new technologies are encouraged and embraced that will improve the business.	☐	☐	☐	☐	☐
4. The CEO/Owner is inventive when it comes to using technology.	☐	☐	☐	☐	☐
5. The CEO/Owner has current knowledge on new technology that can be used in the company.	☐	☐	☐	☐	☐
6. The company culture allows the trial of established or new E-Commerce technologies.	☐	☐	☐	☐	☐
7. Employees have the ability to learn E-Commerce technologies.	☐	☐	☐	☐	☐
8. Employees have the ability to adapt E-Commerce technologies to existing technologies.	☐	☐	☐	☐	☐
9. Managers have the ability to learn E-Commerce technologies.	☐	☐	☐	☐	☐
10. Managers have the ability t oadapt E-Commerce technologies to existing technologies.	☐	☐	☐	☐	☐
11. Management allows the exploration to create new ways of doing business?	☐	☐	☐	☐	☐

Environmental

Questions	**1**	**2**	**3**	**4**	**5**
1. Traditional competition between companies within the industry requires the implementation of E-Commerce technologies.	☐	☐	☐	☐	☐
2. Industry structure requires implementation of E-Commerce technologies.	☐	☐	☐	☐	☐
3. The strategy within the company supports innovative ways of doing business.	☐	☐	☐	☐	☐
4. The company structure encourages innovation.	☐	☐	☐	☐	☐
5. Available technologies influence innovation within the company.	☐	☐	☐	☐	☐
6. Business partners require the use of E-Commerce technologies.	☐	☐	☐	☐	☐
7. The company has flexibility with business partners on what technologies can be used.	☐	☐	☐	☐	☐

Please provide additional comments you feel are relevant and important to your responses on this survey.

Continue Reset

Appendix C

Demographic Statistics

The following demographic information supports the target group of service-oriented small businesses used in this research. The tables that following contain industry participation, number of employees, years the organization has been in business, years the organization has been using online technologies in their business, and finally state and city representation.

Table 32: Complete Industry Representation

Industry	Frequency	Percent	Valid Percent	Cumulative Percent
Accounting	10	6.8	6.8	6.8
Agriculture	1	.7	.7	7.5
Automobile	1	.7	.7	8.2
Construction	2	1.4	1.4	9.6
Consulting	1	.7	.7	10.3
Education	1	.7	.7	11.0
Financial	15	10.3	10.3	21.2
Fitness	1	.7	.7	21.9
Food	7	4.8	4.8	26.7
Graphic Design	2	1.4	1.4	28.1
Healthcare	6	4.1	4.1	32.2
Hospitality	2	1.4	1.4	33.6
Insurance	7	4.8	4.8	38.4
Legal	2	1.4	1.4	39.7
Marketing	2	1.4	1.4	41.1
Medical	3	2.1	2.1	43.2
Other	55	37.7	37.7	80.8
Printing	1	.7	.7	81.5
Real Estate	5	3.4	3.4	84.9
Research	1	.7	.7	85.6
Retail	6	4.1	4.1	89.7
Staffing	1	.7	.7	90.4
Technology	13	8.9	8.9	99.3
Utility	1	.7	.7	100.0

Table 33: Other Industry Representation

Other Industry	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	91	62.3	62.3	62.3
Advertising	1	.7	.7	63.0
Aerial Photography	1	.7	.7	63.7
Agribusiness--farming	1	.7	.7	64.4
Architecture, Design & Landscape Architecture	4	2.8	2.8	67.1
Automotive Repair and Parts Sales	1	.7	.7	67.8
Bank Consulting	1	.7	.7	68.5
Carpet Cleaning	1	.7	.7	69.2
commercial printing	1	.7	.7	69.9
Engineering & Planning	2	1.4	1.4	71.2
Environmental Consulting	2	1.4	1.4	72.6
Gifts	1	.7	.7	73.3
glassblowing studio	1	.7	.7	74.0
Graphic Design	1	.7	.7	74.7
Marriage Family Therapy & Coaching	1	.7	.7	75.3
Multimedia/Audio Video Production	1	.7	.7	76.0
Non-medical, personal care services.	1	.7	.7	76.7
Not Specified	24	16.4	16.4	93.2
pet stylist	1	.7	.7	93.8
publications	1	.7	.7	94.5
Publishing	1	.7	.7	95.2
Research and writing technical manuals	1	.7	.7	95.9
Strategic Innovation & Design	1	.7	.7	96.6
Temporary Staffing	2	1.4	1.4	97.9
Training	1	.7	.7	98.6
Web Design	1	.7	.7	99.3
Wholesale Nursery Grower	1	.7	.7	100.0

Table 34: Number of Employees

# of Employees	Frequency	Percent	Valid Percent	Cumulative Percent
1	83	56.8	56.8	56.8
2	10	6.8	6.8	63.7
3	4	2.7	2.7	66.4
4	6	4.1	4.1	70.5
5	6	4.1	4.1	74.7
6	5	3.4	3.4	78.1
8	1	.7	.7	78.8
9	3	2.1	2.1	80.8
10	3	2.1	2.1	82.9
11 - 15	8	5.5	5.5	88.4
16 - 20	4	2.7	2.7	91.1
21+	13	8.9	8.9	100.0

Table 35: Years Organization has been in Operation

Years	Frequency	Percent	Valid Percent	Cumulative Percent
1	76	52.1	52.1	52.1
2	4	2.7	2.7	54.8
3	9	6.2	6.2	61.0
4	5	3.4	3.4	64.4
5	5	3.4	3.4	67.8
6	16	11.0	11.0	78.8
7	6	4.1	4.1	82.9
8	2	1.4	1.4	84.2
9	23	15.8	15.8	100.0

Table 36: Years Organization has been Online

Years	Frequency	Percent	Valid Percent	Cumulative Percent
1	88	59.6	59.6	59.6
2	9	6.2	6.2	65.8
3	6	4.1	4.1	69.9
4	5	3.4	3.4	73.3
5	7	4.8	4.8	78.1
6	27	18.5	18.5	96.6
7	3	2.1	2.1	98.6
8	2	1.4	1.4	100.0

Table 37: State Representation

State	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	67	45.9	45.9	45.9
CO	5	3.4	3.4	49.3
ID	2	1.4	1.4	50.7
IL	1	.7	.7	51.4
MO	1	.7	.7	52.1
OK	1	.7	.7	52.7
OR	16	11.0	11.0	63.7
TN	1	.7	.7	64.4
TX	1	.7	.7	65.1
UT	43	29.5	29.5	94.5
WA	8	5.5	5.5	100.0

Table 38: City Representation

City	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	67	45.9	45.9	45.9
Ada	1	.7	.7	46.6
Albany	5	3.5	3.5	50.0
Bainbridge Island	1	.7	.7	50.7
Bend	1	.7	.7	51.4
Bloomington	1	.7	.7	52.1
Boulder	3	2.1	2.1	54.1
Bremerton	5	3.4	3.4	57.5
Cedar City	16	11	11	68.5
Clearfield	1	.7	.7	69.2
Dallas	1	.7	.7	69.9
Denver	2	1.4	1.4	71.2
Depoe Bay	2	1.4	1.4	72.6
Farmington	2	1.4	1.4	74.0
Hillsboro	1	.7	.7	74.7
Jefferson	1	.7	.7	75.3
Lincoln City	6	4.2	4.2	79.5
Logan	8	5.6	5.6	84.9
Memphis	1	.7	.7	85.6
Nampa	1	.7	.7	86.3
North Logan	2	1.4	1.4	87.7
Ogden	9	6.2	6.2	93.8
Post Falls	1	.7	.7	94.5
Poulsbo	1	.7	.7	95.2
Providence	1	.7	.7	95.9
Salt Lake city	1	.7	.7	96.6
St. George	1	.7	.7	97.3
St. Louis	1	.7	.7	97.9
Sumner	1	.7	.7	98.6
Washington	1	.7	.7	99.3
West Jordan	1	.7	.7	100.0

Appendix D

Complete Statistical Analysis Results

The following tables reflect the statistical analysis performed in this research. Tables include regression analysis, cross tabulation of variables, correlational analysis, and factor analysis. The following objects were imported from SPSS to maintain integrity of the analysis.

Regression Analysis Tables

Table 39: Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Integration1 Dminn4 Percuseful2 Readiness3 Percuseful4[b]		Enter

a. Dependent Variable: yearsonline
b. All requested variables entered

Table 40: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.349*	.122	.091	2.441

*Predictors: (Constant), integration1, dminn4, percuseful2, readiness3, percuseful4

Table 41: ANOVA[B]

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	116.079	5	23.216	3.895	.002[a]
Residual	834.448	140	5.960		
Total	950.527	145			

a. Predictors: (Constant), integration1, dminn4, percuseful2, readiness3, percuseful4
b. Dependent Variable: yearsonline

Table 42: Coefficients[A]

	Unstandardized Coefficients		Standardized Coefficients		
Model	B	Std. Error	Beta	T	Sig.
(Constant)	1.250	1.090		1.147	.253
Readiness3	.288	.277	.109	1.039	.301
Dminn4	.953	.280	.350	3.405	.001
Percuseful2	-813	.390	-.295	-2.085	.039
Percuseful4	.532	.383	.195	1.390	.167
Integration1	-.731	.277	-.257	-2.637	.009

a. Dependent Variable: yearsonline

Cross-tabulations of all five variables

Table 43: Case Processing Summary of Readiness

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Readiness3 * dminn4	146	100.0	0	0	146	100.0
Readiness3 * percuseful2	146	100.0	0	0	146	100.0
Readiness3 * percuseful4	146	100.0	0	0	146	100.0
Readiness3 * integration1	146	100.0	0	0	146	100.0

Table 44: Cross-tabulation Readiness3 to Dminn4

	Dminn4					
Readiness3	**1**	**2**	**3**	**4**	**5**	**Total**
1	1	1	0	1	0	3
2	1	2	2	3	1	9
3	2	2	11	9	0	24
4	0	2	14	38	7	61
5	0	1	5	18	25	49
Total	4	8	32	69	33	146

Table 45: Cross-tabulation Readiness3 to Percuseful2

	Percuseful2					
Readiness3	**1**	**2**	**3**	**4**	**5**	**Total**
1	2	0	1	0	0	3
2	1	2	3	3	0	9
3	0	2	9	11	2	24
4	0	1	12	32	16	61
5	0	1	3	17	28	49
Total	3	6	28	63	46	146

Table 46: Cross-tabulation Readiness3 to Percuseful4

	Percuseful4					
Readiness3	**1**	**2**	**3**	**4**	**5**	**Total**
1	1	1	1	0	0	3
2	1	2	2	4	0	9
3	2	1	10	8	3	24
4	0	2	11	34	14	61
5	0	0	3	22	24	49
Total	4	6	27	68	41	146

Table 47: Cross-tabulation Readiness3 to Integration1

	Integration1					
Readiness3	**1**	**2**	**3**	**4**	**5**	**Total**
1	1	0	2	0	0	3
2	2	1	4	1	1	9
3	0	1	12	9	2	24
4	0	4	17	31	9	61
5	0	1	5	25	18	49
Total	3	7	40	66	30	146

Table 48: Case Processing Summary of Dminn4

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
dminn4 * percuseful2	146	100.0	0	0	146	100.0
Dminn * percuseful4	146	100.0	0	0	146	100.0
Dminn4 * integration1	146	100.0	0	0	146	100.0

Table 49: Cross-tabulation Dminn4 to Percuseful2

	Percuseful2					
Dminn4	1	2	3	4	5	Total
1	2	1	1	0	0	4
2	1	2	1	4	0	8
3	0	2	10	13	7	32
4	0	0	14	39	16	69
5	0	1	2	7	23	33
Total	3	6	28	63	46	146

Table 50: Cross-tabulation Dminn4 to Percuseful4

	Percuseful4					
Dminn4	1	2	3	4	5	Total
1	3	0	1	0	0	4
2	0	2	2	4	0	8
3	0	2	11	13	6	32
4	1	1	10	44	13	69
5	0	1	3	7	22	33
Total	4	6	27	68	41	146

Table 51: Cross-tabulation Dminn4 to Integration1

	Integration1					
Readiness3	**1**	**2**	**3**	**4**	**5**	**Total**
1	2	1	0	1	0	4
2	0	0	4	3	1	8
3	1	2	16	11	2	32
4	0	3	18	39	9	69
5	0	1	2	12	18	33
Total	3	7	40	66	30	146

Table 52: Case Processing Summary of Percuseful2

	Cases					
	Valid		Missing		Total	
	N	**Percent**	**N**	**Percent**	**N**	**Percent**
percuseful2*percuseful4	146	100.0	0	0	146	100.0
percuseful2* integration1	146	100.0	0	0	146	100.0

Table 53: Cross-tabulation Percuseful2 to Percuseful4

	Percuseful4					
Percuseful2	**1**	**2**	**3**	**4**	**5**	**Total**
1	2	1	0	0	0	3
2	1	2	2	1	0	6
3	1	3	16	8	0	28
4	0	0	8	50	5	63
5	0	0	1	9	36	46
Total	4	6	27	68	41	146

Table 54: Cross-tabulation Percuseful2 to Integration1

	Integration1					
Percuseful2	**1**	**2**	**3**	**4**	**5**	**Total**
1	2	0	1	0	0	3
2	0	1	2	1	2	6
3	1	1	16	7	3	28
4	0	3	14	43	3	63
5	0	2	7	15	22	46
Total	3	7	40	66	30	146

Table 55: Case Processing Summary of Percuseful4

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Percuseful4* integration1	146	100.0	0	0	146	100.0

Table 56: Cross-tabulation Percuseful4 to Integration1

	Integration1					
Percuseful4	1	2	3	4	5	Total
1	2	0	0	2	0	4
2	1	1	4	0	0	6
3	0	1	16	7	3	27
4	0	4	14	43	7	68
5	0	1	6	14	20	41
Total	3	7	40	66	30	146

Correlational Analysis of Variables

The following tables and figures provide the correlational analysis that was done in this study regarding all of the variables used in the research.

Table 57: Descriptive Statistics - Percuseful Variables

Factor	Mean	Std. Deviation	N
Percuseful1	3.77	.974	146
Percuseful2	3.98	.928	146
Percuseful3	3.63	1.120	146
Percuseful4	3.93	.937	146
Percuseful5	4.07	.930	146
Percuseful6	3.82	1.024	146

Table 58: Correlation of Percuseful Variables

		peruseful 1	peruseful 2	peruseful 3	peruseful 4	peruseful 5	peruseful 6
percuseful1	Pearson Correlation	1	.704(**)	.555(**)	.716(**)	.703(**)	.691(**)
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	146	146	146	146	146	146
percuseful2	Pearson Correlation	.704(**)	1	.682(**)	.807(**)	.801(**)	.772(**)
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	146	146	146	146	146	146
percuseful3	Pearson Correlation	.555(**)	.682(**)	1	.738(**)	.601(**)	.673(**)
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	146	146	146	146	146	146
percuseful4	Pearson Correlation	.716(**)	.807(**)	.738(**)	1	.821(**)	.799(**)
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	146	146	146	146	146	146
percuseful5	Pearson Correlation	.703(**)	.801(**)	.601(**)	.821(**)	1	.781(**)
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	146	146	146	146	146	146
percuseful6	Pearson Correlation	.691(**)	.772(**)	.673(**)	.799(**)	.781(**)	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	146	146	146	146	146	146

** Correlation is significant at the 0.01 level (2-tailed).

Table 59: Descriptive Statistics Compatibility with Business Processes Variables

Factor	Mean	Std. Deviation	N
Compbp1	3.87	.991	146
Compbp2	3.62	1.039	146
Compbp3	3.55	.917	146

Table 60: Correlation of Compbp Variables

		compbp1	compbp2	compbp3
compbp1	Pearson Correlation	1	.092	.368(**)
	Sig. (2-tailed)		.270	.000
	N	146	146	146
compbp2	Pearson Correlation	.092	1	-.057
	Sig. (2-tailed)	.270		.491
	N	146	146	146
compbp3	Pearson Correlation	.368(**)	-.057	1
	Sig. (2-tailed)	.000	.491	
	N	146	146	146

** Correlation is significant at the 0.01 level (2-tailed).

Table 61: Descriptive Statistics Integration Variables

Factor	Mean	Std. Deviation	N
Integration1	3.77	.900	146
Integration2	3.51	1.071	146
Integration3	3.86	.855	146
Integration4	3.55	1.011	146

Table 62: Correlation of Integration Variables

		integration1	integration2	integration3	integration4
integration1	Pearson Correlation	1	.729(**)	.316(**)	.175(*)
	Sig. (2-tailed)		.000	.000	.035
	N	146	146	146	146
integration2	Pearson Correlation	.729(**)	1	.269(**)	.076
	Sig. (2-tailed)	.000		.001	.363
	N	146	146	146	146
integration3	Pearson Correlation	.316(**)	.269(**)	1	.531(**)
	Sig. (2-tailed)	.000	.001		.000
	N	146	146	146	146
integration4	Pearson Correlation	.175(*)	.076	.531(**)	1
	Sig. (2-tailed)	.035	.363	.000	
	N	146	146	146	146

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 63: Descriptive Statistics Readiness Variables

Factor	Mean	Std. Deviation	N
Readiness1	3.57	1.043	146
Readiness2	3.60	1.007	146
Readiness3	3.99	.968	146

Table 64: Correlation of Readiness Variables

		readiness1	readiness2	readiness3
readiness1	Pearson Correlation	1	.699(**)	.649(**)
	Sig. (2-tailed)		.000	.000
	N	146	146	146
readiness2	Pearson Correlation	.699(**)	1	.602(**)
	Sig. (2-tailed)	.000		.000
	N	146	146	146
readiness3	Pearson Correlation	.649(**)	.602(**)	1
	Sig. (2-tailed)	.000	.000	
	N	146	146	146

** Correlation is significant at the 0.01 level (2-tailed).

Table 65: Descriptive Statistics Dminn Variables

Factor	Mean	Std. Deviation	N
Dminn1	3.85	1.085	146
Dminn2	3.62	1.115	146
Dminn3	3.78	.958	146
Dminn4	3.82	.940	146
Dminn5	3.71	.955	146
Dminn6	3.87	.949	146
Dminn7	3.74	.969	146
Dminn8	4.05	.931	146

Table 66: Correlations of Dminn Variables

		dminn1	dminn2	dminn3	dminn4	dminn5	dminn6	dminn7	dminn8
dminn1	Pearson Correlation	1	.796(**)	.731(**)	.446(**)	.436(**)	.537(**)	.520(**)	.452(**)
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000
	N	146	146	146	146	146	146	146	146
dminn2	Pearson Correlation	.796(**)	1	.704(**)	.512(**)	.484(**)	.612(**)	.592(**)	.512(**)
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000
	N	146	146	146	146	146	146	146	146
dminn3	Pearson Correlation	.731(**)	.704(**)	1	.637(**)	.622(**)	.712(**)	.696(**)	.532(**)
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000	.000
	N	146	146	146	146	146	146	146	146
dminn4	Pearson Correlation	.446(**)	.512(**)	.637(**)	1	.861(**)	.832(**)	.750(**)	.572(**)
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000	.000
	N	146	146	146	146	146	146	146	146
dminn5	Pearson Correlation	.436(**)	.484(**)	.622(**)	.861(**)	1	.779(**)	.833(**)	.577(**)
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000	.000
	N	146	146	146	146	146	146	146	146
dminn6	Pearson Correlation	.537(**)	.612(**)	.712(**)	.832(**)	.779(**)	1	.893(**)	.586(**)
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000	.000
	N	146	146	146	146	146	146	146	146
dminn7	Pearson Correlation	.520(**)	.592(**)	.696(**)	.750(**)	.833(**)	.893(**)	1	.574(**)
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000		.000
	N	146	146	146	146	146	146	146	146
dminn8	Pearson Correlation	.452(**)	.512(**)	.532(**)	.572(**)	.577(**)	.586(**)	.574(**)	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	
	N	146	146	146	146	146	146	146	146

** Correlation is significant at the 0.01 level (2-tailed).

Table 67: Descriptive Statistics Innovation Variables

Factor	Mean	Std. Deviation	N
Innovation1	3.61	1.194	146
Innovation2	3.42	1.196	146
Innovation3	4.05	.942	146
Innovation4	4.03	.924	146
Innovation5	3.86	.899	146

Table 68: Correlation of Innovation Variables

		innovation1	innovation2	innovation3	innovation4	innovation5
innovation1	Pearson Correlation	1	.849(**)	.483(**)	.366(**)	.483(**)
	Sig. (2-tailed)		.000	.000	.000	.000
	N	146	146	146	146	146
innovation2	Pearson Correlation	.849(**)	1	.515(**)	.395(**)	.547(**)
	Sig. (2-tailed)	.000		.000	.000	.000
	N	146	146	146	146	146
innovation3	Pearson Correlation	.483(**)	.515(**)	1	.814(**)	.675(**)
	Sig. (2-tailed)	.000	.000		.000	.000
	N	146	146	146	146	146
innovation4	Pearson Correlation	.366(**)	.395(**)	.814(**)	1	.652(**)
	Sig. (2-tailed)	.000	.000	.000		.000
	N	146	146	146	146	146
innovation5	Pearson Correlation	.483(**)	.547(**)	.675(**)	.652(**)	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	146	146	146	146	146

** Correlation is significant at the 0.01 level (2-tailed).

Table 69: Descriptive Statistics Business Partner Variables

Factor	Mean	Std. Deviation	N
Buspart1	3.27	1.223	146
Buspart2	3.55	.947	146

Table 70: Correlation of Buspart Variables

		buspart1	buspart2
buspart1	Pearson Correlation	1	.386(**)
	Sig. (2-tailed)		.000
	N	146	146
buspart2	Pearson Correlation	.386(**)	1
	Sig. (2-tailed)	.000	
	N	146	146

** Correlation is significant at the 0.01 level (2-tailed).

This concludes the correlational analysis portion of statistics.

Additional Analysis

An additional step-wise regression was done on the final five factors to see what correlations may show among these factors and the dependent variable (yearsonline). Tables 71 and 72 show the results of this regression. R-square for this regression started at 0.426 and stepped to 0.445, a change of 0.19.

Table 71: Stepwise Regression of Independent Variables (Dependent=Yearsonline; N=145)

Model		Unstandardized Coefficients		Standardized Coefficients	t	
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.888	.201		4.420	.000
	emps	.360	.035	.653	10.337	.000
2	(Constant)	-.508	.668		-.760	.448
	emps	.349	.035	.634	10.071	.000
	dminn4	.375	.171	.138	2.189	.030

Table 72: Excluded Variables from Stepwise Regression (Dependent=Yearsonline)

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	readiness3	.094(a)	1.500	.136	.124	.999
	dminn4	.138(a)	2.189	.030	.180	.981
	percuseful4	.076(a)	1.198	.233	.100	1.000
	integration1	-.018(a)	-.287	.775	-.024	.993
2	readiness3	.031(b)	.415	.678	.035	.719
	percuseful4	.005(b)	.075	.941	.006	.725
	integration1	-.115(b)	-1.601	.112	-.133	.747

a Predictors in the Model: (Constant), emps
b Predictors in the Model: (Constant), emps, dminn4
c Dependent Variable: yearsonline

In terms of the regression, there is not a considerable amount of change from the initial regression performed earlier in this study. The correlations did not change from the earlier regression (see Table 27, p.58). However, the influence of the integration factor was reduced in its negative effects on the dependent variable (yearsonline). Table 73 shows the correlations of the stepwise regression analysis.

Table 73: Stepwise Correlations of Independent Variables (Dependent=Yearsonline; N=146)

	yearsonline	emps	readiness3	dminn4	percuseful4	integration1
yearsonline	1.000	.653	.109	.225	.070	-.071
emps	.653	1.000	.023	.138	-.009	-.081
readiness3	.109	.023	1.000	.528	.546	.471
dminn4	.225	.138	.528	1.000	.518	.480
percuseful4	.070	-.009	.546	.518	1.000	.497
integration1	-.071	-.081	.471	.480	.497	1.000

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