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Social Influence and Organizational Innovation Characteristics on Enterprise Social Computing Adoption

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Walden University
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Abstract

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Abstract

Ample research has been conducted to identify the determinants of information technology (IT) adoption. No previous quantitative researchers have explored IT adoption in the context of enterprise social computing (ESC). The purpose of this study was to test and extend the social influence model of IT adoption. In addition, this study addressed a gap in the research literature and presented a model that relates the independent variables of social action, social consensus, social authority, social cooperation, perceived relative advantage, perceived compatibility, perceived ease of use, perceived usefulness, and organizational commitment to the dependent variables of social embracement and embedment. A randomized stepwise multiple linear regression analysis was performed on survey data from 125 C-level executives (i.e., chief information officers and chief technology officers). The analysis found that executives consider perceived relative advantage, organizational commitment, and social computing action as the most significant factors relating to the adoption of ESC. Executives' perceptions about ESC could impact organizational commitment, implementation, and use of such technologies. The findings could make a social contribution within organizations by helping C-level executives understand the degree to which these factors contribute to the ESC adoption. The knowledge from this study may also help organizations derive operational effectiveness, efficiency, and create business value for their clients and society.

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Dedication

I dedicate this dissertation to my loving wife, Louise; my beautiful daughter, Olivia; and my handsome son, Aiden. You inspire me each day to be my best, love more deeply, and live life with passion.

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I wish to acknowledge the faculty, colleagues, family, and friends who have contributed to my success in all walks of life and who supported me while I pursued this doctoral degree. I also want to thank each individual for his or her respective talents and motivational support.

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stood by me, and that support has made all the difference in my world. I am truly blessed to have you as my parents.

To my brother, John, and my sisters, Celeste and Marielena, I want to express my love and appreciation for all of your support. John, you taught me how to "bob and weave" and not fall over when life threw those unexpected curves at me. Celeste and Marielena, you both taught me how to get in touch with my emotions and better express my personal feelings.

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Chapter 1: Introduction to the Study

Introduction

The advent of low-cost Internet connectivity, abundant computer technology, highly available mobile devices, and sophisticated collaborative and social software has brought about a significant change in the manner in which people communicate, socialize, and conduct business. At the center of it all is the emerging phenomenon known as *social computing*. No longer are people looking solely toward the media, corporations, and religious or political leaders for input, guidance, or direction; rather, they are looking toward one another. Social computing technologies (i.e., person-to-person [P2P] technologies, social networking, online communities, etc.) now allow people to obtain information and give feedback on products and services in ways that have forced companies to change past management practices and adopt new customer- and community-oriented business strategies (Adjei, Noble, & Noble, 2010; Wang, Shi, Ma, Shi, & Yan, 2012). According to Charron, Favier, and Li (2006), "To thrive in an era of social computing, companies must abandon top-down management and communication tactics, weave communities into their products and services, use employees and partners as marketers, and become part of a living fabric of brand loyalists" (p. 1).

This study was an exploration of the adoption of social computing by commercial enterprises. For the purposes of this study, the terms *technology* and *information technology* (IT) were used interchangeably, and the term *enterprise social computing* (ESC) referred to the use of social computing technologies by corporations. When the

term *social computing* was used without reference to the enterprise, it connoted a broader meaning that did not restrict the use of social computing to just the enterprise; social computing also referred to the use of social information applications (i.e., social networking, instant messaging [IM], blogging, forums, photo sharing, etc.) internal and external (i.e., for public use) to commercial enterprises.

ESC was examined at the level of the individual, targeting C-level executives' (i.e., chief information officers' [CIOs'] and chief technology officers' [CTOs']) perceptions about its benefit and value to their organizations and relevancy to greater workforce effectiveness, improved organizational communication, faster cycle time on innovations, and improved partner and vendor relationships. This study was conducted to illustrate the potential of ESC to facilitate positive social change within commercial organizations and society. Included in Chapter 1 are descriptions of the research problem; focus and purpose of the study; null and alternative hypotheses; independent and dependent variables (IVs and DVs); theoretical and conceptual framework; nature of the study; assumptions, scope, and limitations; and significance of the study.

Background

A review of the literature revealed that no prior quantitative studies had approached IT adoption in an ESC context. Many researchers have studied user adoption of IT, but no researcher has investigated IT adoption by targeting executives in social computing situations. Only one model, the *social influence model* (SIM) of technology adoption, has been proposed to illustrate the social constructs that are perceived to relate to IT adoption in a social computing context. Vannoy and Palvia (2010) developed the

SIM to address this gap in understanding. Preceding the work of Vannoy and Palvia, Davis (1989) as well as Venkatesh, Speier, and Morris (2002) presented different views on perceived usefulness and ease of use as controlling factors influencing IT adoption. Parameswaran and Whinston (2007) offered further insight into the research issues with social computing, and Y.-H. Lee, Hsieh, and Hsu (2011) found that social computing plays a crucial role in human behavior and decision making. Because prior research investigating IT adoption in a social computing context has been scant, this research was important in addressing a gap in the literature and improving the current understanding of the influence of social computing on human behavior and decision making in commercial organizations.

Problem Statement

A significant amount of research has been conducted to identify factors that can help to predict IT acceptance (i.e., theory of reasoned action [TRA], technology acceptance model [TAM], diffusion of innovations theory, etc.). No previous quantitative researchers have explored IT adoption in an ESC context. The role of social influence and organizational innovation characteristics in the adoption of ESC has not yet been researched. Malhotra and Galletta (1999) commented that the TAM (Davis, 1989) is "incomplete in one important respect: it doesn't account for social influence in the adoption and utilization of new information systems" (p. 1). Vannoy and Palvia (2010) noted, "There is little research that approaches adoption in the context of social computing" (p. 149).

Based upon the research findings of the past 5 years, this study addressed the gap and provided CIOs and CTOs with a research model that can help to explain the factors contributing to IT adoption in an ESC context. The study was based upon the theoretically grounded SIM of technology adoption developed by Vannoy and Palvia (2010). A new model that builds upon and extends the SIM is presented.

Purpose of the Study

The purpose of this quantitative study was to operationalize, test, and extend the SIM, which was based upon seven seminal theories: social action theory (Chapin, 1936); consensus theory (Horowitz, 1962); cooperation theory (Axelrod, 2000); social theory of authority (Zambrano, 2000); social influence (Kelman, 1958); TRA (Ajzen & Fishbein, 1975); and TAM (Davis, 1989). The SIM holds the four antecedents of social influence (i.e., social computing action, social computing consensus, social computing cooperation, and social computing authority) and the two TAM variables of perceived ease of use and perceived usefulness. The four antecedent constructs were combined to relate to social influence. Each of the four antecedents of social influence is an IV. The technology acceptance construct has two IVs: perceived ease of use and perceived usefulness. The two DVs relevant to technology adoption are embedment and embracement.

Research into the SIM and relevant theory associated with the diffusion of innovations and IT adoption has suggested that additional predictors are necessary to account for the perceptions of C-level executives concerning the adoption of ESC in commercial organizations. As a result, the SIM was extended to include an organizational innovation characteristics construct that comprised three IVs: perceived relative

advantage, perceived compatibility, and organizational commitment. These three predictors have been researched and documented extensively for their role in influencing the adoption of IT innovations. The new model, the extended SIM (ESIM) of technology adoption, includes an organizational innovation characteristic construct that is based upon the diffusion of innovations theory (Rogers, 2003) and the research of Turner (2007). The ESIM of technology adoption was offered to represent completely the social and organizational innovation characteristics that helped to explain C-level executives' perceptions about the adoption of ESC.

Further, this study describes and explores an emerging managerial problem facing many organizations—that is, the use of ESC as a way to improve social and business interactions, increase business value, and maintain competitiveness (Vannoy & Palvia, 2010). The study presents a new model that relates social influence and organizational innovation characteristic factors to factors for ESC adoption. The results taken from this study can help to guide organizations whose leaders are interested in leveraging ESC to accelerate technology adoption and foster collaboration and innovation between and among employees.

Research Questions and Hypotheses

Three research questions and their hypotheses guided this study. Hypotheses 4 and 5 are reserved for future inquiries.

Research Question 1: What are C-level executives' perceptions of social influence? The social influence construct examined four IVs: social computing consensus, social computing cooperation, social computing authority, and social

computing action. In Hypothesis 1, each IV was tested against the DVs of embedment and embracement, respectively.

Alternative Hypothesis 1: The ESIM of technology adoption will result in the following significant relationships:

- H_{a1a}: There is a significant relationship between social computing consensus and embracement.
- H_{a1b}: There is a significant relationship between social computing consensus and embedment.
- H_{a1c}: There is a significant relationship between social computing cooperation and embracement.
- H_{a1d}: There is a significant relationship between social computing cooperation and embedment.
- H_{a1e}: There is a significant relationship between social computing authority and embracement.
- H_{a1f}: There is a significant relationship between social computing authority and embedment.
- H_{a1g}: There is a significant relationship between social computing action and embracement.
- H_{a1h}: There is a significant relationship between social computing action and embedment.

Null Hypothesis 1

- H_{01a}: There is no relationship between social computing consensus and embracement.
- H_{01b}: There is no relationship between social computing consensus and embedment.
- H_{01c}: There is no relationship between social computing cooperation and embracement.
- H_{01d}: There is no relationship between social computing cooperation and embedment.
- H_{01e}: There is no relationship between social computing authority and embracement.
- H_{01f}: There is no relationship between social computing authority and embedment.
- H_{01g}: There is no relationship between social computing action and embracement.
- H_{01h}: There is no relationship between social computing action and embedment.

Research Question 2: What are C-level executives' perceptions of organizational innovation characteristics? The organizational innovation characteristic construct was used in examining three IVs: organizational commitment, perceived relative advantage, and perceived compatibility. In Hypothesis 2, each IV was tested against the DVs of embedment and embracement, respectively.

Alternative Hypothesis 2: The ESIM of technology adoption will result in the following significant relationships:

- H_{a2a}: There is a significant relationship between organizational commitment and embracement.
- H_{a2b}: There is a significant relationship between organizational commitment and embedment.
- H_{a2c}: There is a significant relationship between perceived relative advantage and embracement.
- H_{a2d}: There is a significant relationship between perceived relative advantage and embedment.
- H_{a2e}: There is a significant relationship between perceived compatibility and embracement.
- H_{a2f}: There is a significant relationship between perceived compatibility and embedment.

Null Hypothesis 2

- H_{02a}: There is no relationship between organizational commitment and embracement.
- H_{02b}: There is no relationship between organizational commitment and embedment.
- H_{02c}: There is no relationship between perceived relative advantage and embracement.

- H_{02d}: There is no relationship between perceived relative advantage and embedment.
- H_{02e}: There is no relationship between perceived compatibility and embracement.
- H_{02f}: There is no relationship between perceived compatibility and embedment.

Research Question 3: What are C-level executives' perceptions of the acceptance of ESC? The technology acceptance construct examined two IVs: perceived ease of use and perceived usefulness. In Hypothesis 3, each of the IVs was tested against the DVs of embedment and embracement, respectively.

Alternative Hypothesis 3: The ESIM of technology adoption will result in the following significant relationships:

- H_{a3a}: There is a significant relationship between perceived ease of use and embracement.
- H_{a3b}: There is a significant relationship between perceived ease of use and embedment.
- H_{a3c}: There is a significant relationship between perceived usefulness and embracement.
- H_{a3d}: There is a significant relationship between perceived usefulness and embedment.

Null Hypothesis 3

- H_{03a}: There is no relationship between perceived ease of use and embracement.
- H_{03b}: There is no relationship between perceived ease of use and embedment.
- H_{03c}: There is no relationship between perceived usefulness and embracement.
- H_{03d}: There is no relationship between perceived usefulness and embedment.

Hypothesis 4: There is a statistically significant relationship between organizations that use ESC and the rate of innovation, as measured by the number of patents.

Hypothesis 5: Organizations that adopt social computing will create more disruptive innovations than organizations that do not adopt social computing.

Each of the variables was measured using a 5-point Likert scale that ranged from 1 (*strong disagreement*) to 5 (*strong agreement*).

Theoretical Framework

The theoretical foundation of the study was Vannoy and Palvia's (2010) SIM of technology adoption. The SIM is based upon seven seminal theories: social action theory (Chapin, 1936); consensus theory (Horowitz, 1962); cooperation theory (Axelrod, 2000); social theory of authority (Zambrano, 2000); social influence (Kelman, 1958); TRA

(Ajzen & Fishbein, 1975); and TAM (Davis, 1989). Each foundational theory supports the major constructs of the SIM and is explained more fully in Chapter 2. Because the SIM is the only theoretically grounded model that addresses technology adoption in the context of social computing, it facilitated further insight into the social factors that influence technology adoption.

The conceptual framework was designed to predict as well as explain the behaviors of individuals and groups when they interact using social and collaborative ITs. The ESIM of Technology Adoption Survey (see Appendix A) was developed to operationalize and extend the SIM. The constructs of social influence and organizational innovation characteristics are logically linked in the ESIM to reveal how these behaviors relate to technology adoption, in particular ESC. A detailed analysis relating the IVs (i.e., the variables associated with social influence, organizational innovation characteristics, and technology acceptance) to the DVs of embedment and embracement is provided in Chapter 2.

Nature of the Study

The research design and methodology followed a quantitative approach. The rationale for choosing a quantitative method was based upon limitations to my access to C-level executives and the ability to capture current data using a survey instrument. The sample consisted of C-level executives from randomly selected commercial organizations in the United States. An online survey was distributed to 29,475 randomly selected C-level executives to collect the data required to support the research. Once the data were collected, a multiple linear regression analysis and a bivarate analysis were performed.

Operational Definitions

Following are the operational definitions associated with the variables identified in the hypotheses and model.

Embedment: Vannoy and Palvia (2010) stated,

> Embedment is measured by evaluating the degree to which others in the environment utilize the technology in the same way, at the same time or greater level, the degree to which the message provided by the technology is understood by the recipient, and the degree to which the user views the technology as a necessity. (p. 153)

Embracement: According to Vannoy and Palvia (2010), "Embracement is measured by evaluating the value of the technology to the individual, the empowerment experienced by the individual and the degree of anticipation by which the technology is viewed" (p. 153).

Organizational commitment: Turner (2007) defined organizational commitment in the context of management intervention:

> Management commitment and/or support of innovation can be expressed in a variety of ways including provision of adequate resources, "by example" through personal use, and/or visible messages of encouragement and advocacy (Agarwal, 2000, p. 100). Research from several perspectives, including organization change management, has found organizational/management commitment a consistently significant factor in innovation diffusion. (p. 154)

Perceived compatibility: Rogers (2003) defined *compatibility* as "the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and need of potential adopters" (p. 15). In addition, Rogers made the generalized statement that "compatibility of an innovation, as perceived by members of a social system, is positively related to its rate of adoption" (p. 249).

Perceived ease of use: Davis (1989) defined perceived ease of use as "the degree to which a person believes that using a particular system would be free of effort" (p. 320).

Perceived relative advantage: According to Rogers (2003), relative advantage is "the degree to which an innovation is perceived as better than the idea it supersedes. The degree of relative advantage may be measured in economic terms, but social prestige factors, convenience, and satisfaction are also important factors" (p. 15). Rogers also found that "the greater the perceived relative advantage of an innovation, the more rapid its rate of adoption was" (p. 15).

Perceived usefulness: Davis (1989) defined perceived usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance" (p. 320).

Social computing: I found no common definition for social computing in the literature review. In general, the term has been used to describe a collection of ITs used on the Internet to promote the creation of user content, online communities, and a host other of other social and business activities. Although the term has enjoyed a variety of definitions, the definition offered by Vannoy and Palvia (2010) was used in this study. They defined social computing as "intra-group social and business actions practiced

through group consensus, group cooperation, and group authority, where such actions are made possible through the mediation of information technologies, and where group interaction causes members to conform and influence others to join the group" (p. 149).

Social computing action: Vannoy and Palvia (2010) defined social computing action as action that "did not occur through a well-thought out plan, but occurred due to interrelationships among social forces" (p. 152).

Social computing authority: According to Vannoy and Palvia (2010), social computing authority "proposes that a relation of authority exists when an individual performs some action because it is dictated by others and when there is acceptance of authority by the individuals" (p. 152).

Social computing consensus: According to Vannoy and Palvia (2010), social computing consensus "states that an action is right if there is agreement from all people who are involved in a particular situation that it is right" (p. 152).

Social computing cooperation: Vannoy and Palvia (2010) stated that "social cooperation theory examines what is best for the individual actor in the short term versus what is best for the group in the long run and whether the cooperation is in the best interests of all" (p. 152).

Survey Design and Approach

The unit of analysis of the survey design was at the individual level of adoption experienced by C-level executive management. Social computing was treated as the technological innovation about which the participants' responses reflected a range of decision-making choices for adoption by commercial organizations. The results of this study suggested that the DVs of technology adoption (i.e., embedment and embracement) in a social computing context will add new knowledge to the research literature.

A quantitative online survey was used to collect data from randomly selected C-level IT executives of organizations in the United States. The quantitative analysis tested seven IVs identified from the literature review—social action, social consensus, social cooperation, social authority, perceived ease of use, perceived usefulness, perceived relative advantage, perceived compatibility, and organizational commitment—to determine their relationship to the two DVs of embracement and embedment. The strength of the relationship of the IVs to the DVs was useful in exploring the innovation adoption decision-making process at the executive level. The literature review suggested that concerns and fears exist among IT executives, particularly in regard to the attributes associated with ESC (e.g., network security, employee trust, return on investment [ROI], operating costs, productivity, and reputation risk; Adula, 2010; Chai & Kim, 2010). Yet IT executives also recognize the significant potential that ESC holds for innovation, collaboration, and value creation. The purpose of the quantitative analysis was to confirm that these variables were the factors that influenced the executives who participated in this study in their decision-making process and adoption of ESC.

The survey design was based upon questions previously created by Moon, Rowley, and Yang (2009) as well as Turner (2007). Turner measured the perceptions, attitudes, and behaviors of employees toward an IT innovation after their organization had made the decision to adopt the technology. He developed and validated the survey, measuring the reliability using Cronbach's alpha. A minimal threshold value of .70 was used for the Cronbach's alpha reliability test. In comparison, Moon et al. developed and validated a survey using a Fornell and Larker composite scale reliability index of .7.

A significant portion of the research questions were adapted and modified from these two previous questionnaires to reflect the perceptions, attitudes, and behaviors of C-level IT executives. A pilot test and a retest were conducted on the survey designed for this study to ensure that it exceeded a Cronbach's alpha threshold of .70 to achieve acceptable levels of validity and reliability. Upon completion of validity and reliability testing, a statistical analysis was performed to examine the degree to which the hypothesized relationships were supported by the collected survey data (Turner, 2007).

Data Collection

The research data were collected via voluntary completion of the survey by randomly selected C-level executives across a variety of commercial organizations. An e-mail was sent to the executives describing the purpose of the study and encouraging their participation. A hyperlink was included in the e-mail for the respondents' convenience and to encourage completion of the survey, which was accessible to the executives via SurveyMonkey, an online survey capture service. The survey was posted for 2 weeks, and the respondents were asked to submit their final responses via the online survey tool.

The responses were captured electronically and stored in the survey service database. The survey data were then exported from SurveyMonkey to a local thumb drive for secure safekeeping. Access to the data was restricted to my use only (see Appendix B).

Assumptions

The methodology held several assumptions. First, participation by all respondents was voluntary. Second, the respondents' answers to the survey items reflected truthful and objective perceptions as well as unbiased opinions. Third, each respondent possessed a functional understanding of ESC. The assumptions were necessary to ensure that proper ethical standards were maintained throughout the study.

Scope and Delimitations

An online survey was used to collect responses from the C-level executives. Also collected were organizational data on job position, organization size, and company name. The survey constructs were derived from the diffusion of innovations theory, the TAM, and other related scholarly research. All constructs had been researched extensively and had appeared previously in the literature, including peer-reviewed journal articles, research manuals, and books. Each hypothesis was addressed to identify the strength of the relationship between each IV and DV. A validity assessment of the survey was performed using a pilot test and a retest to ensure that it exceeded a Cronbach's alpha threshold of .70. The pilot and retest revealed a Cronbach's alpha of .93.

The online survey remained open for 2 weeks from the date of the original distribution to ensure the maximum number of responses. The sample consisted of C-level executives only. Lower level managers were not invited to complete the survey.

Researchers have cautioned against making generalizations based upon the results of a single innovation, so formalizing generalizations might require finding results across similar innovations.

Limitations

The study was limited to an exploratory analysis of the relationship between the SIM of technology adoption and the role of ESC as an innovation. The study focused on a single IT innovation: ESC. The study was conducted using a quantitative methodology, so there were limitations to the complexity of questions asked, the order in which the questions were administered, and the spontaneity of responses because of the structure of the survey. In addition, the nature of quantitative surveys does not permit researchers to observe and capture the participants' nonverbal behaviors. To avoid introducing systematic error or sample bias, I employed random sampling. A Microsoft random generator was used to randomize the order of survey e-mail addresses selected from the target population.

Significance

The study is significant because of the exponential growth in the use of social computing and increased global pressure on companies to be competitive and innovative. The study can help executives to understand the factors that can affect the adoption of ESC and the ways in which this emerging computing platform can engender a collaborative and innovative workplace environment in their organizations. The study also is significant because it addresses a gap in the research literature, operationalizes and tests the theoretically grounded research model of Vannoy and Palvia (2010), and extends

the body of knowledge to the field of IT adoption. The findings (i.e., factor identification and significance) can help to guide executive decision making relevant to ESC investment, implementation, and adoption.

The use of ESC is important because it possesses tremendous potential to foster collaboration and innovation, as well as add business value. Nevertheless, ESC must overcome concerns regarding trust, privacy, security, productivity, cultural shifts, business models, measurement of ROI, and social network integration before it is adopted by organizations, delivers business value, and demonstrates its full potential. If these challenges are not overcome, then ESC risks becoming an IT environment for specialized and limited applications only.

Summary

The study presents an integrated model that relates social influence and innovation characteristics to IT adoption. The factors (e.g., predictors) that previous researchers have suggested are responsible for influencing executives' adoption of IT were presented. The ESIM was constructed to consider the social influences and other important factors involved in executive decision making within commercial organizations. In particular, the study explored and examined these factors in the context of ESC. The survey used to collect the data was based upon the diffusion of innovation theory, social influence theory, the TAM, and previous research from peer-reviewed articles and journals. The survey's IVs were made operational, and details about the administration of the survey and the collection of the data were presented. In Chapter 2, a review of the research literature is presented. Also included is an explanation of the

literature search strategy, a discussion of the theoretical foundation and conceptual framework, and information about the key variables and concepts of the study.

Chapter 2: Literature Review

Introduction

Since its introduction in 1986, the TAM has been studied and applied extensively to describe individual behavior toward the adoption of IT (Y. Lee, Kozar, & Larsen, 2003). More than 100 journal articles have been written by researchers using the model, yet few of them have leveraged the theory to help to explain IT adoption within organizations in a social computing context. To date, only one model exists that incorporates the basic theory derived from the TAM and the social influence theory in order to explain IT adoption in a social computing context. This model, developed by Vannoy and Palvia (2010), is known as the SIM of technology adoption.

The Research Gap

The SIM was offered by Vannoy and Palvia (2010) to further the understanding of IT adoption in a social computing context, "where the technology is embraced rather than simply accepted by the user, and where the action made possible by technology is seen as a behavior embedded in society" (p. 149). However, the SIM is incomplete and suffers from three major gaps. First, the model has not had the social influence construct variables identified to make it operational. Second, the model does not account for the influence of an organization's innovation characteristics on IT adoption. Research on the SIM and relevant theory associated with the diffusion of innovations and IT adoption suggests that additional predictors are necessary to account for the perception of C-level executives toward the adoption of ESC in commercial organizations. Third, a quantitative

analysis has not yet been performed on the model to understand its strengths and limitations toward predicting IT adoption within organizations.

The first gap was addressed by making operational the IVs associated with the construct of social influence. These IVs were based upon four related phenomena identified by Vannoy and Palvia (2010): social computing action, social computing consensus, social computing cooperation, and social computing authority. The four IVs make up the social influence construct found in the SIM of technology adoption model.

The second gap was addressed by adding a construct of organizational innovation characteristics to the model that comprised three variables. The first two variables, known as *relative advantage* and *compatibility* (Rogers, 2003), originated from the diffusion of innovation theory. The third variable, *organizational commitment*, was presented in the research of Turner (2007).

The third gap was addressed by conducting a quantitative analysis of the nine IVs, which yielded two multivariate linear regression equations that help explain the relationship between the IVs and DVs of embracement and embedment. The embracement equation found that perceived relative advantage, organizational commitment, social action, and perceived ease of use were significant predictors of IT adoption. The embedment equation found that perceived relative advantage, organizational commitment, social computing action, and social computing consensus were significant and contributed the highest predictive strength toward explaining embedment of ESC technology. Thus, the ESIM of IT adoption was developed to represent the social and organizational innovation characteristics that helped to explain

the C-level executives' perceptions and extend the body of literature in the field of social computing adoption.

The literature review is divided into five sections: Literature Search Strategy, Theoretical Foundation, Conceptual Framework, Literature Review Related to Key Variables and Concepts, and Summary and Conclusions. Contained in the Literature Search Strategy section are the key library databases and search engines accessed for the review. In addition, the scope of the literature is described in terms of types of sources and seminal theorists. The Theoretical Foundation section describes the research theories and explains the rationale for choosing the SIM. In the Conceptual Framework section, the works of seminal theorists are described, examined, and synthesized to explain their relationship to the research model. Within the Literature Review Related to Key Variables and Concepts section, the constructs of interest are described, the strength and weaknesses of theories are revealed, and the key IVs and DVs are explained. Finally, the Summary and Conclusion section summarizes the major points in the chapter.

Literature Search Strategy

Literature from several databases was searched using the following search engines: Academic Search Complete, ProQuest Central, Thoreau Database, Business Source Complete, ABI/INFORM Complete, and Google Scholar. The key search terms were *social influence*, *technology acceptance*, *diffusion of innovations*, *innovation characteristics*, and *social computing*. In some cases, the terms were used in combination to broaden the field for the database search.

The scope of the literature review spanned 1 year and included prior research conducted in order to complete Walden University's Knowledge Area Modules (KAM), dissertation prospectus, and dissertation proposal. This study drew upon seminal theories described in texts; these theories included, but were not limited to, the laws of imitation (Tarde, 1890/1903); the diffusion of innovations (Rogers, 2003); the tipping point (Gladwell, 2002); and the social factor (Azua, 2010). In addition, a comprehensive list of seminal and current peer-reviewed journal articles and periodicals was referenced that related to social influence, technology acceptance, and the diffusion of innovations. Included in the study were references to seminal articles on the TRA (Ajzen & Fishbein, 1975); the TAM (Davis, 1989); the social influence theory (Kelman, 1958); and the SIM (Vannoy & Palvia, 2010). In addition, references were made to Turner's (2007) research on the diffusion of collaboration technology.

Theoretical Foundation

This study investigated the factors hypothesized to contribute to the adoption and diffusion of social and collaborative IT in commercial corporate enterprises. The specific area of research was different from those of previous IT adoption and diffusion studies in that this study investigated the IT adoption behaviors of individuals (e.g., C-level executives), meaning that social technologies had already been embraced by and embedded in society (Vannoy & Palvia, 2010). This recent phenomenon is transforming the manner in which executives perform business, interact with business partners and vendors, and communicate with individuals internal and external to their respective organizations.

The research model describing IT adoption in a social context was derived from three interdependent theories: diffusion of innovations (Rogers, 2003; Ryan & Gross, 1943; Tarde, 1890/1903); TAM (Davis, 1989); and social influence (Axelrod, 2000; Chapin, 1936; Horowitz, 1962; Kelman, 1958; Zambrano, 2000). Each seminal theory reflects an understanding of the important role of social factors in influencing behaviors (Turner, 2007). More recently, researchers have applied the social influence theory to the TAM to better understand its impact on IT adoption. Malhotra and Galletta (1999) extended the TAM to include social influence. They also defined social influence only in terms of Kelman's (1958) processes of social influence (compliance, identification, and internalization). Similarly, Moon et al. (2009) used the TAM to study the impact of social influence on knowledge workers' perceptions and adoption of IT.

This study drew upon the theories that the SIM of technology adoption was based upon, namely, the TAM and the diffusion of innovation theory. The SIM was based upon seven seminal theories: social action theory (Chapin, 1936); consensus theory (Horowitz, 1962); cooperation theory (Axelrod, 2000); social theory of authority (Zambrano, 2000); social influence (Kelman, 1958); TRA (Ajzen & Fishbein, 1975); and TAM (Davis, 1989). Vannoy and Palvia (2010) offered the SIM and endeavored to explain "technology acceptance in social computing situations where technology is embraced rather than simply accepted by the user, and where the action made possible by technology is seen as a behavior embedded in society" (p. 149). The TAM and the diffusion of innovations theory were the basis for the construct of organizational innovation characteristics. The

research questions directly inquired into the degree to which organizations adopt ESC based upon their social influence and innovation diffusion characteristics.

The phenomenon of diffusion and adoption by individuals in social situations was first documented by Tarde (1898/1899). Tarde, a French attorney, judge, and professor of modern philosophy in the Collège de France, published one of the first recorded accounts of diffusion research. He also was extremely interested in sociology and the behavioral phenomenon known as *imitation*. Tarde set out to outline, define, and systematize the sociological laws of imitation and the principles driving the diffusion of new ideas into society. He posited that three general sociological laws are common to all cultures: repetition, opposition, and adaptation.

Conceptual Framework

Tarde's Laws of Imitation

Tarde (1898/1899) observed that *repetition*, or the indefinite occurrence of a reproductive cycle, happens throughout nature and in all scientific disciplines. According to Tarde, "Repetition means the production of something that at the same time preserves the original; it implies simple and elementary causation without creation" (p. 4). Tarde viewed repetition as a key causal component in the formation of geometric progressions. He considered repetition one of the primary driving factors in the diffusion process. Tarde suggested that new ideas are propagated or diffused into social groups or society by the repeated imitation of thoughts from one person to another.

Tarde (1890/1903) perceived imitation as a "fundamental truth of social science" (p. V). Tarde stated, "Socially, everything is either invention or imitation" (p. 3). Hence, Tarde believed that all social constructs, that is, behavior, language, or customs, could be considered the result of one person imitating another repetitiously and in a geometric progression.

The fact that this phenomenon followed a mathematical geometric progression allowed Tarde (1898/1899) to hypothesize that the rate of diffusion could be measured and calculated, provided that there are no opposing forces or ideas to prohibit its propagation. Tarde did observe that in science, as well as in nature, opposing forces are always involved, whether one is considering the force of gravity on the Earth's atmosphere, the opposing forces that act to create states of equilibrium, or the force of one person's radical idea against the status quo. Tarde termed this phenomenon the *law of opposition*. From Tarde's perspective, opposition in the form of interference can either act as a resistive force against growth or propagation or give rise to new constructs, beliefs, and ideas. Opposition, in a social context, helps to modify repeated imitations and creates variations in beliefs and desires as ideas spread among the members of social groups or society in general.

Over time, the contrast that opposition provides against the geometric propagation created by imitative repetition has a tendency to lead to a more harmonious state that Tarde (1898/1899) termed *adaptation*. In a social context, adaptation is a phenomenon in which infinitesimal repetitious imitations expand to the extent that they help society to gain a deeper understanding and move closer to a more harmonious state (Tarde,

1898/1899). As such, each progressive adaptation transforms society, expands its collective knowledge and awareness, and leads to the creation of new ideas and innovations (Bulut, Eren, & Halac, 2013).

According to Tarde (1898/1899),

> Social adaptation is some individual invention that is destined to be imitated, that is, the felicitous interference of two imitations, occurring first in one single mind; and this harmony, though quite internal in origin, tends to not only externalize itself as is spreads, but also to unite with some other invention, in a logical couple, thanks to imitative diffusion, and so on, until, by successive complications and harmonizations of the harmonies, the grand collective works of the human mind are constructed—a grammar, a theology, a encyclopedia, a code of laws, a natural or artificial organization of labor, a scheme of aesthetics or a system of ethics. (p. 204)

Taken together, repetition, opposition, and adaptation constitute in science and in society the underlying principles behind the "similarities, contrasts, and harmonies" observed in life (Tarde, 1898/1899, p. 202). Tarde's (1898/1899) thesis concerning these principles or general laws offered a systematic way to describe the process of diffusion and understand how diffusion impacts society. His theory helped to explain how repetitious imitation carries forward what society deems useful, beneficial, and supportive of the expansion of new ideas and innovations. Of equal importance was Tarde's explanation of how repetitious imitation sometimes operates "in favor of adaptation" (p. 213) and that this type of expansive diffusion process can lead to rapid

change at a profound level. In either regard, Tarde observed that the principles were key not only to help to describe the process of diffusion of new ideas into society, but also to reveal a broader process at work, namely universal social change.

By applying the general principles of repetition, opposition, and adaptation to the field of sociological statistics, Tarde (1898/1899) derived the notion that all diffusion of innovations, or rates of adoption, follow a similar S-shaped pattern when plotted on a graph over time. Tarde recognized that all new ideas and innovations take time to be accepted, and he correctly noted that the rate of acceptance begins and increases significantly once a person of noted influence and societal recognition begins to use the new idea (Rogers, 2003). The *S curve*, as it was later labeled, illustrated the fact that after an innovation spreads through society, it eventually reaches a saturation point and then plateaus.

More than 4 decades after Tarde's (1898/1899) seminal analytical observations of diffusion, Ryan and Gross (1943) conducted a study on the diffusion of hybrid seed corn that opened the door to a new paradigm for diffusion studies. According to Rogers (2003), Ryan and Gross's study was "the most influential diffusion study of all time" (p. 31). Ryan and Gross sought to understand the process and agencies responsible for the phenomenally rapid adoption of hybrid corn seed by Midwestern U.S. farmers between 1933 and 1939. According to Ryan and Gross, "Between 1933 and 1939, the acreage in hybrid corn increased from 40,000 to 24 million acres" (p. 15). This rapid rate of diffusion, which occurred just years after the greatest economic depression in U.S.

history, made the time suitable for Ryan and Gross to conduct their academic analysis and inquiry.

The Hybrid Corn Study of Ryan and Gross

In the late 1920s, agricultural scientists at Iowa State University and other land grant universities developed the hybrid corn seed as an alternative to less productive and drought-sensitive types of corn seed. Studies performed by agricultural scientists revealed that hybrid corn seed could produce approximately 20% more corn per acre, was drought resistant, and was easier to harvest than open-pollinated corn seed (Rogers, 2003). In contrast to standard corn seed, hybrid corn seed lost its ability to reproduce with hardy corn seed after the first year of being planted. This meant that farmers had to purchase new hybrid corn seed each year. This dependency on hybrid corn seed from commercial manufacturers significantly changed corn-growing practices and altered the farmers' past behaviors (Rogers, 2003).

The time frame of the hybrid corn seed study provided Ryan and Gross (1943) with several interesting insights into the social factors and behaviors that influenced the Iowa farmers' decision making and their adoption rates. During the 1930s, the U.S. economy was in a deep depression, and the cost of food production was soaring. The development of hybrid corn seed and its potential to increase corn yield by 20% per acre should have favored the rapid adoption of this new agricultural technology. Ryan and Gross's analysis of the qualitative data captured through personal interviews with farmers in two Iowa communities revealed a more conservative initial response to hybrid corn seed.

The data collected by Ryan and Gross (1943) revealed a delay rather than an initial rapid spread in the full usage of the hybrid seed by farmers. Several factors contributed to the farmers' behavior. First, the new practice required farmers to outlay cash or obtain credit to purchase the hybrid seed. Given the economic uncertainty of the times, farmers were hesitant to either obtain credit or outlay large amounts of cash (Ryan & Gross, 1943). Second, there was wariness among the farmers that they would actually witness for themselves an increase in hybrid corn seed performance.

Farmers initially planted only a small portion of their acreage with the hybrid corn seed until they became fully convinced of its increased yield potential and adopted the new practice. This behavior occurred despite adequate publications made available by the Iowa Agricultural Extension Service and commercial sales representatives. Rogers stated (2003), "Some farmers waited many years to adopt, during which they were surrounded by neighbors who were successfully using the innovation" (p. 55). In fact, Ryan and Gross (1943) discovered that it was not until the neighbors communicated their success stories to the farmers that the rate of innovation began to rapidly increase (Kosinets, de Valck, Wojnicki, & Wilner, 2010). According to Ryan and Gross, the neighbors' successful experience with the new seed significantly influenced the farmers' decision to acceptance the hybrid seed. In addition, they found that the personal contact made by commercial sales representatives was an important factor in disseminating initial seed information to the farmers and later persuading them to adopt the hybrid corn seed.

As the years passed, the data revealed that the influence of neighbors far exceeded the ability of sales representatives to convince the farmers to adopt the new seed (Ryan &

Gross, 1943). Hence, Ryan and Gross (1943) ascertained that two distinct "diffusion agencies" (p. 21) were at work in the Iowa hybrid corn seed study: an introductory mechanism and an activating agent. Based upon the interview data, the sales representatives acted as the introductory mechanism by providing the farmers with information and research literature on the hybrid corn seed; the neighbors assumed the role of activating agents by influencing the farmers and convincing them to adopt the hybrid seed. Although each path provided a different channel of communication, they both served an important role in the farmers' decision-making process and the diffusion rate of new seed technology.

The hybrid corn seed study by Ryan and Gross (1943) created a new paradigm for diffusion of innovation research and helped to improve understanding of the social process associated with decision making. According to Valente (1995), "Ryan and Gross showed that the diffusion of an innovation was a social process" (p. 2) and that economic decision making and the spread of diffusion, from the time of early adopters to late adopters, is influenced by "social structural and socio-psychological factors" (p. 2). Ryan and Gross's hybrid corn seed study captured and accounted for many of the social variables influencing adoption and diffusion: year when farmer adopted the hybrid corn seed; farmer's age, education, and farm size; frequency with which farmer traveled to the city; and farmer's readership of farm magazines (as cited in Rogers, 2003). Hence, Ryan and Gross asserted that in general, social subjectivity plays a significant and important role in economic decision making and influences the process of diffusion of innovations.

Ryan and Gross (1943) found that a cumulative plot of farmers' adoption rate of the hybrid corn seed between 1932 and 1943 formed an S-shape curve. Their findings confirmed Tarde's (1890/1903) general observations that all innovations follow similar diffusion patterns of S-curves when the adoption rates of the innovations are plotted over time. The S-curve, which mathematicians refer to as the logistic curve, indicates that in the early stages of the diffusion process, only a small number of adopters, categorized as innovators and early adopters, accept an innovation (Valente, 1995). As time progresses, larger numbers of people begin to accept the innovation, so the rate of adoption increases rapidly. Eventually, the majority of people adopt the innovation, and a saturation point is reached (Adner & Kapoor, 2015).

Nearly 20 years after the hybrid corn study of Ryan and Gross (1943), Rogers (2003) published a comprehensive study on the subject of diffusion of innovations that synthesized the research from 405 publications on diffusion studies. Rogers's in-depth analysis and interdisciplinary research of the topic yielded a theory for the diffusion of innovations that is one of the most cited within the field. According to Rogers, "Diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system" (p. 474).

Rogers's Diffusion of Innovations

Rogers (2003) asserted that diffusion is a special case, particularly in the context of type of communication, meaning that the message centers around or is about a new idea. The newness of the idea does not necessarily mean that the idea needs to be novel or unique. Instead, all that is required is that an individual or an organization perceive it as

new for it to be applied to the diffusion of innovation process. As Rogers stated, “If an idea seems new to the individual, it is an innovation” (p. 6).

Rogers (2003) also noted that along with the perception of new idea comes a level of uncertainty. In comparison to Tarde (1898/1899), Rogers also realized that competing or alternative ideas have a direct influence on decision making and that the degree of uncertainty is directly related to the number of alternative ideas or choices competing for acceptance. Therefore, uncertainty, like Tarde’s principle of opposition, acts as a potential force against the propagation of a new belief or idea. Rogers, who suggested that the level of uncertainty can be reduced by information, noted, “A technological innovation embodies information and thus reduces uncertainty about cause-effect relationships in problem solving” (p. 6). The amount, type, and accuracy of the information can help to allay concerns about the new idea.

Rogers’s Five-Stage Innovation-Decision Process Model

New ideas hold the power to expand knowledge, change attitudes, and provide new perspectives; at the same time, they can increase uncertainty, shift one or more existing paradigms, and cause disruption. So, how is the decision made whether or not to adopt new innovations? Is there a method or model that an individual or an organization can follow to ease the innovation-decision process? According to Rogers (2003), researchers who have explored these questions have found that any decision-making process follows similar stages. His own model for the innovation-decision process has five stages: knowledge, persuasion, decision, implementation, and confirmation.

In Stages 1 and 2, the process involves moving from the point where an individual or another decision-making entity gains initial knowledge of a new idea to developing an interest or an attitude toward either accepting or rejecting the idea. In Stages 3 and 4, the individual or the decision-making entity makes a conscientious choice either to adopt the idea or to take action to implement the idea. In Stage 5, the individual or the decision-making entity confirms that the decision was correct based upon reinforcing information. Rogers's (2003) model not only describes the process of choices and actions required to decide whether or not to adopt an innovation but also implies that the individual or the decision-making entity must contend with the uncertainty and risk involved with making a new choice. According to Rogers, "The perceived newness of an innovation, and the uncertainty associated with the newness, is a distinctive aspect of innovation decision-making (compared to other types of decision making)" (p. 168). Hence, for individuals or decision-making entities, Rogers's five-stage process is one way for them to understand the choices and actions needed over time to evaluate and decide whether or not to adopt innovations.

Role of Communication Channels in the Innovation-Decision Process

Rogers's (2003) five stages of the innovation-decision process not only represent the process by which decisions are made to adopt or reject innovations but also serve to increase current understanding of the role and importance of communication channels in the adoption process. By definition, communication channels are the mechanisms or methods by which information is passed from sender to receiver. There are several categories of communication channels, and each type of communication channel has an

important role at different stages of the innovation-decision process. Rogers categorized these roles "(1) as either interpersonal or mass media in nature and (2) as originating from either localite or cosmopolite sources" (p. 217).

Interpersonal communication channels disseminate messages or information between two or among more than two people. Mass media, in the form of newspapers, magazines, radio, television, and the Internet, relay messages or information from a single source to much larger audiences. According to Rogers (2003), "Mass media channels are relatively more important at the knowledge stage, and interpersonal channels are relatively more important at the persuasion stage in innovation-decision process" (p. 205). Thus, mass media are important in providing general awareness of messages at the knowledge stage, but it is actually more important for interpersonal communication and social influence to occur between and among peers to persuade others to adopt an innovation (Peres, Muller, & Mahajan, 2010).

Links between sources outside a social system and an individual are, by Rogers's (2003) definition, cosmopolite communication channels. According to Rogers, such channels "are relatively more important at the knowledge stage" (p. 207). Conversely, localite channels are sources within a social system and an individual. Like interpersonal channels, localite channels are more important during the persuasion stage in the innovation-decision process (Rogers, 2003).

Understanding the Rate of Adoption

Rogers (2003) defined rate of adoption as "the relative speed with which an innovation is an adopted by members of a social system" (p. 221). The speed of adoption

is of major interest to organizations because it is the preeminent measure of product or service diffusion, success, and potential profit. The rate of adoption is measured by the slope of the S-curve, normally in terms of the number of adopters per unit of time (generally per year).

In connection with the five-stage innovation-decision process, Rogers (2003) suggested that all innovations have five variables that determine the adoption rate of innovations: (a) perceived attributes of innovations, (b) types of innovation decision, (c) communication channels, (d) nature of the social system, and (e) extent of change agents' promotion efforts. The perceived attributes of innovations relate to the characteristics of the innovations as they are viewed by individuals. This is an important point, especially when considering potential adopters, whose perceptions of the attributes of innovations will influence the rate of adoption more significantly than experts' view of the attributes will (Rogers, 2003). The category of perceived attributes of innovations holds the five attributes most frequently investigated by researchers: relative advantage, compatibility, complexity, trialability, and observability.

According to Rogers (2003), the degree of relative advantage often is expressed as economic profitability, social prestige, or some other way. Relative advantage is the level of advantage that an innovation has over an existing product or service that tries to meet a current need. Many early adopters can affect the rate of adoption by judging an innovation on economic grounds or by attaching a measure of social prestige to an innovation rather than judging an innovation on more practical grounds like improved functionality, utility, or service.

Compatibility is a measure of how much an innovation is perceived by a potential adopter to be related to existing values, needs, and past experience (Rogers, 2003). The closer a new idea or an innovation is to a potential adapter's values, needs, and past experience, the higher is the probability that the innovation will be viewed as favorable and more likely to be adopted. Just as compatibility is important in human relationships, innovation must align well with a potential adapter's values, needs, and past experience to be accepted.

Complexity is the measure to which an innovation is perceived as difficult to use or understand (Rogers, 2003). Increases in complexity actually reduce the rate of adoption: The more complex an innovation is perceived, the slower is the speed with which individuals and groups will accept the innovation.

Trialability is the measure of experience gained from the limited trial use of an innovation (Rogers, 2003). In other words, trialability is related to how comfortable and accepting an individual feels toward an innovation after having limited time to try the innovation. According to Rogers (2003), trialability is more important to early adopters than to later adopters because early adopters have no precedent to refer to or one that can influence their adoption decision. Lastly, observability is the measure of how easy it is to observe and describe the results of an innovation to another person (Roger, 2003). Innovations with a higher degree of observability have higher rates of adoption because the ease of communicating the benefits and observing the results minimizes any uncertainty associated with new ideas.

IT Acceptance

Davis (1989) developed the TAM and posited that two factors in particular influence individuals' decisions to adopt technology, namely, perceived usefulness and perceived ease of use. Davis defined perceived usefulness as "the degree to which a person believes that using a particular system would enhance his or her job performance" (p. 320). Davis also noted that "perceived ease of use, in contrast, refers to the degree to which a person believes that using a particular system would be free of effort" (p. 320). Figure 1 is an illustration of the TAM (based upon Davis, Bagozzi, & Warshaw, 1989) and the factors influencing individual behavioral intention to use an innovation.

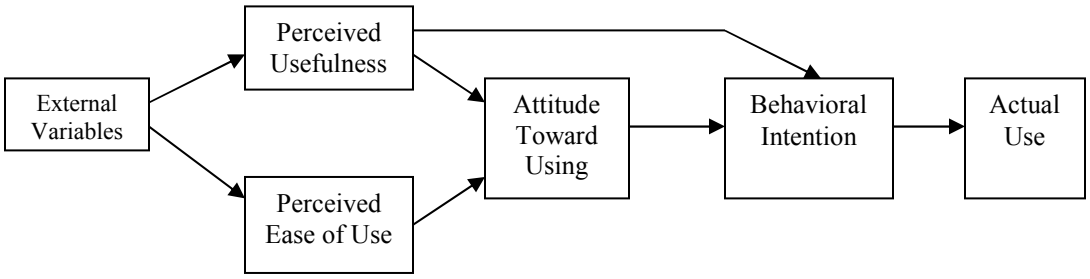

Figure 1. Technology acceptance model. Adapted from "Extending the Technology Acceptance Model to Account for Social Influence: Theoretical Bases and Empirical Validation," by Y. Malhotra & D. Galletta, 1999, *Proceedings of the 32nd Hawaii International Conference on System Sciences*, p. 2. Copyright 1999 by IEEE.

The TAM was developed as an extension of Ajzen and Fishbein's (1975) TRA (see Figure 2). The TRA added behavioral intention to the process of persuasion when one is making a decision. Ajzen and Fishbein found that some conditions or factors can restrict the influence of attitudes on behavior. For instance, if an individual has an attitude of acceptance toward gambling, but no money to gamble, then the individual's lack of money will prevent that person from gambling, despite acceptance of the behavior.

Researchers have simplified the TAM by removing the behavioral attitude construct found in the TRA (Venkatesh, Morris, Davis, & Davis, 2003).

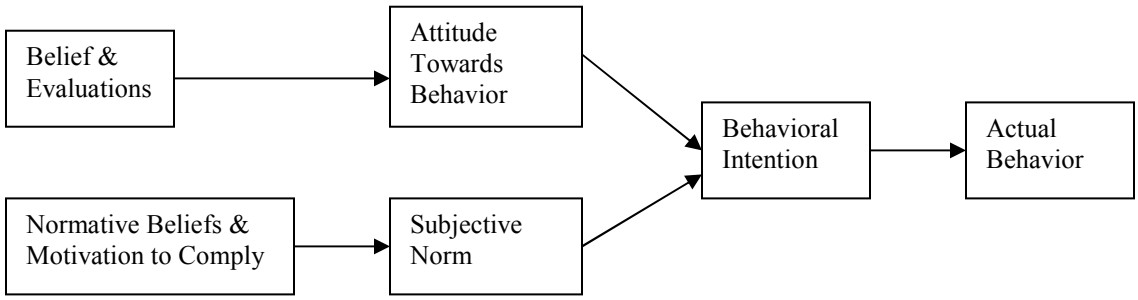

Figure 2. Ajzen and Fishbein's (1975) theory of reasoned action. Adapted from "Extending the Technology Acceptance Model to Account for Social Influence: Theoretical Bases and Empirical Validation," by Y. Malhotra & D. Galletta , 1999, *Proceedings of the 32nd Hawaii International Conference on System Sciences*, p. 2. Copyright 1999 by IEEE.

Shortly after the introduction of the TAM, Davis (1989), as well as Davis et al. (1989), suggested that the TAM could be improved by accounting for the role of subjective norms (i.e., social influence) in IT acceptance behaviors (as cited in Malhotra & Galletta, 1999). Subsequently, Malhotra and Galletta (1999) conducted research that extended the TAM by accounting for social influence, that is, by introducing a construct termed *psychological attachment* that contained Kelman's three processes for social influence: compliance, identification, and internalization. According to Malhotra and Galletta, "Based on Kelman's framework, Davis [et al.] (1989) had noted that social influences may affect behavioral intention (BI) indirectly via attitude (A) due to internalization and identification processes, or influence BI directly via compliance" (p. 4; see Figure 3).

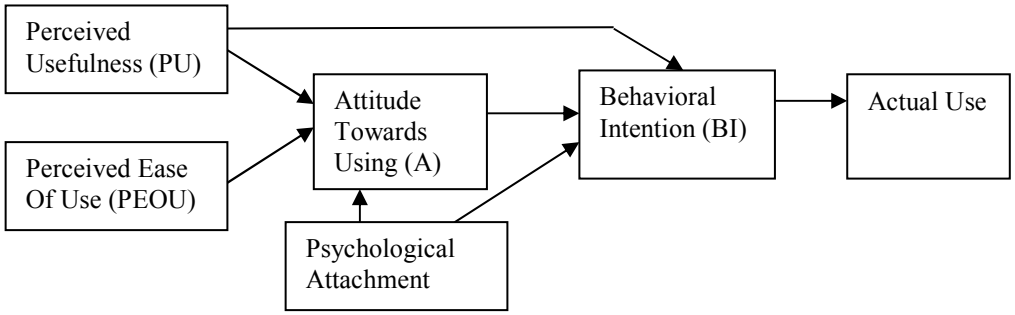

Figure 3. TAM extended to account for social influence. Adapted from "Extending the Technology Acceptance Model to Account for Social Influence: Theoretical Bases and Empirical Validation," by Y. Malhotra & D. Galletta, 1999, *Proceedings of the 32nd Hawaii International Conference on System Sciences*, p. 4. Copyright 1999 by IEEE.

Social Influence

Kelman (1958) was interested in determining whether external factors (e.g., communication of information or individual influence) could change an individual's attitude. Kelman delved into the process of change and attempted to understand whether the process would lead to a temporary or a permanent change in attitude. Kelman posited that change takes place at different "levels" and that attitudinal change occurs when an individual "accepts influence" (or "conforms"; as cited in Malhotra & Galletta, 1999, p. 3).

Kelman (1958) identified three different processes of social influence affecting individual behavior: compliance, identification, and internalization:

> *Compliance* can be said to occur when an individual accepts influence because he hopes to achieve a favorable reaction from another person or group; i*dentification* when an individual accepts influence because she wants to establish or maintain a satisfying self-defining relationship to another person or group, and

internalization: when individual accepts influence because it is congruent with her value system. (p. 53)

Social Action

Prior to the work of Kelman (1958), Chapin (1936) theorized that two forms of social action can lead to social change. One form occurs as a result of a planned, goal-oriented action, and the other emerges as an outcome of unplanned events (Chapin, 1936; Cheung, Chiu, & Lee, 2011). The first form is obvious: The achievement of a particular goal sets an action into motion with the intent of bringing about a desired result. The second form emerges as the result of unintended consequences. For example, text messaging in social and collaborative computing environments emerged from publishing services that wanted interactions with customers on service updates and customer feedback. Shortly thereafter, end users learned of the technology and adopted it to engage in peer-to-peer communications, broadcast social events, and establish online communities. Later, the technology was developed for the use of multisession online chats and interactive social networks (Cheung & Lee, 2010).

Social Consensus

Horowitz (1962) conducted a sociological study to investigate the growth and application of consensus theory and explain its historical relationship to conflict and cooperation theory. Horowitz argued that the term *consensus* lacked clarity in its definition and was a construct developed to connote "functional efficiency" toward mass social accord (p. 178). As a proponent of conflict and cooperation theory, Horowitz argued that the supporters of consensus theory had rallied around the theory to steer

"away from the knotty issue of how conflicts arise and are settled to the spatially and temporally more durable issue of how men cooperate with one another" (p. 179). Horowitz supported the view that consensus theory coerces the masses into a state of acceptance, that is, a form of controlled social behavior, rather than allowing for conflict to arise and be resolved, which is beneficial to the formation of a healthy social structure. Coser (as cited in Horowitz, 1962) stated, "Such conflicts tend to make possible readjustments for norms and power relations within groups in accordance with the felt needs of its individual members or subgroups" (p. 180). In comparison, Axelrod (2000) wrote that conflict and consensus are just different perspectives trying to understand and explain social cooperation, which is among the socials forces comprising the whole of social influence.

Social Cooperation

Axelrod and Hamilton (1981) further inquired into the nature and origins of social cooperation theory. They presented a probabilistic model grounded in the "concept of evolutionary stable strategy in the context of the Prisoner's Dilemma game" (p. 1391). To determine the true nature of social cooperation, Axelrod (as cited in Axelrod & Hamilton, 1981) studied the ways in which social cooperation related to game theory and other factors like reciprocity.

Axelrod chose to study the nature of social cooperation in relation to game theory because game theory offered a wide range of examples of how social cooperation could be initiated based upon reciprocity. According to Axelrod (2000), "The basic problem that Cooperation Theory addresses is the common tension between what is good for the

individual actor in the short run, and what is good for the group in the long run" (p. 3). In particular, Axelrod (as cited in Axelrod & Hamilton, 1981) chose the iterated Prisoner's Dilemma game as the basis of his analysis because it simply and effectively exemplified the problem of "achieving mutual cooperation" (p. 1391). According to Axelrod, "The dilemma is caused by the fact that the temptation payoff for unilateral defection, is greater that the sucker's payoff for unilateral cooperation" (as cited in Axelrod & Hamilton, 1981, p. 4). The Prisoner's Dilemma game embodies the problem of deciding what is best for either an individual or a group based upon information and reciprocity. Neither player knows when the decision making will end, thus setting up a situation where cooperation can occur based upon reciprocity.

Social Theory of Authority

Similar to the social cooperation theory, the social theory of authority examines the relationship between the individuals who establish or indicate the rules and those who follow them. Zambrano (2000) referred to this relationship as the authority relationship, one that has been in existence since recorded history and occurs in every community, where individuals rely on one another to survive, transact business, and flourish. Zambrano stated, "The legitimacy of an authority relation is what keeps the relationship from breaking down, and is the answer to the question: why does the one who follows do as indicated by the one who rules?" (p. 1).

Zambrano (2000) posited that the authority relationship is fundamentally an "interaction between individuals" that is maintained by an "equilibrium of beliefs" and bound by "situation (motivation, desires, and circumstances)" and individual choices

(p. 9). In essence, the authority relationship continues as long as the interactions and beliefs of one individual or group of individuals do not misalign with the choices available in any given situation (Portes & Vickstrom, 2011).

Application of IT Adoption to Previous Research

The phenomenon of IT adoption in the context of ESC has been articulated by relatively few researchers. The few researchers who have investigated it (e.g., Butler, Raeth, Urbach, & Smolnik, 2012; Moon et al., 2009; Vannoy & Palvia, 2010) have approached the research from different perspectives. Moon et al. (2009) investigated users' perception and adoption of IT by expanding the TAM to include a social influence construct. Moon et al.'s construct of social influence holds four components: subjective norms, image, visibility, and voluntariness.

First, the subjective norm is a measure of the degree to which individuals allow themselves to be influenced by others when seeking information or wishing to reduce the amount of risk in their own decision making (Moon et al., 2009). Second, the image component, as defined by Moore and Benbasat (1991), i**s** "the degree to which use of an innovation is perceived to enhance one's image or status in one's social system" (p. 195). Third, visibility is the degree to which adoption of an innovation is made visible to the organization; thus, the more visible the innovation, the higher the potential for user adoption becomes (Rogers, 2003). Fourth, voluntariness is the extent to which potential adopters perceive the adoption decision as voluntary or of free will (Moore & Benbasat, 1991; Rogers, 2003; Venkatesh & Davis, 2000). The model relates the four components

of the social influence construct to perceived usefulness, perceived ease of use, and intention to use.

Vannoy and Palvia (2010) developed a similar model, but construct of social influence (Moon et al., 2009) was based upon four different seminal theories: social action, social consensus, social cooperation, and social authority. Vannoy and Palvia related social influence to two DVs: embedment and embracement. The current study benefits from the SIM and the theoretical framework developed by the aforementioned researchers, both of which served as the foundation of my ESIM. Figure 4 depicts the SIM of technology adoption.

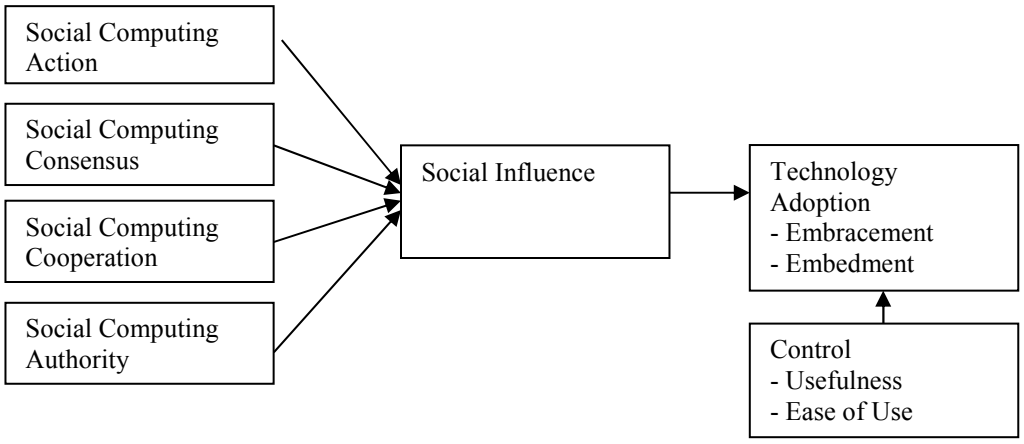

Figure 4. SIM of technology adoption. Adapted from "The Social Influence Model of Technology Adoption," by S. Vannoy and P. Palvia, 2010, *Communication of the ACM*, p. 152. Copyright 2010 ACM.

Literature Review Related to Key Variables and Concepts

IT Adoption in a Social Computing Context

Vannoy and Palvia (2010) stated, "There are few research studies that approach technology adoption in the context of social computing" (p. 149). Today, ESC is a rapidly advancing IT within professional organizations. Because ESC is a nascent

technology, it has not enjoyed significant academic research. Scholars have yet to agree upon a common definition of ESC.

Vannoy and Palvia (2010) offered one broad definition:

> Intra-group social and business actions practiced through group consensus, group cooperation, and group authority, where such actions are made possible through the mediation of information technologies, and where group interaction causes members to conform and influence others to join the group. (p. 149)

In contrast, Parameswaran (2007) defined social computing as "a large number of new applications and services that facilitate collective action and social interaction online with rich exchange of multimedia information and evolution of aggregate knowledge" (p. 762). Although sometimes associated with the term *social networking*, ESC extends beyond social networking to include a host of technologies that can further influence groups (e.g., employees, customers, business partners, and online communities) to interact, collaborate, innovate, and then disseminate ideas. Examples of ESC IT include blogs, photo and video sharing, wikis, peer-to-peer networks, online business networks, tagging, crowd sourcing, online social communities, and social analytics.

According to Parameswaran (2007), social computing "holds tremendous disruptive potential in the business world and can significantly impact society…and illustrates the fundamental shifts in communication, computing, collaboration, and commerce brought about by this trend" (p. 762). In comparison, Rogers (2003) wrote that "interactive communication technologies may be changing the diffusion process in certain fundamental ways, such as by removing, or at least greatly diminishing, the role

of spatial distance in who talks to whom about a new idea" (p. xix). Because of the abundance of technological devices, applications, and networks, ESC is making it easier and faster for individuals and groups to communicate interactively and innovate, diffuse, and adopt new ideas.

Perceived Characteristics of ESC

The diffusion of innovations theory is a research paradigm explaining the factors and conditions that cause the dissemination, acceptance, or rejection of new ideas or practices (Brown-Woodson, 2002). Rogers (2003) defined diffusion of innovations as "the process by which an innovation is communicated through certain channels over time among members of a social system" (p. 11). Four major elements, that is, innovation, communication channels, time, and social system, characterize the diffusion process, and according to Rogers, they "are identifiable in every diffusion research study" (p. 11).

Documented observations and generalization about diffusion of innovations date back to the work of Tarde (1890/1903) on imitation. Tarde developed the laws of imitation by analyzing a large number of legal cases and observing the societal trends occurring in his lifetime, although it was not until Ryan and Gross (1943) conducted their study on hybrid corn seed that "the basic paradigm for studying diffusion" was established (Rogers, 2003, p. 46). Rogers (2003) observed that by the early 1960s, diffusion studies had developed from multiple disciplines and that all of the social sciences and humanities had in some way tried to address the question of the ways in which new ideas and practices spread. Rogers determined that between 1941 and 1981, there were 434 rural publications on diffusion. Rogers's initial development of the

diffusion of innovations theory in the early 1960s was the result of synthesizing more than 500 previous studies on the subject of innovation diffusion (Turner, 2007). Rogers's pioneering efforts found that "the diffusion of innovations explains social change" and is "one of the most fundamental of human processes" (p. xvii). Fichman (1992) defined diffusion as "the process by which innovations spread through populations of potential adopters" (p. 2).

Rogers (2003) stated:

> Diffusion is a kind of social change, defined as the process by which alteration occurs in the structure and function of the social system. When ideas are invented, diffused, and adopted or rejected, leading to certain consequences, social change occurs…we use the word "diffusion" to include planned and spontaneous spread of new ideas. (p. 6)

Rogers (2003) posited that there are five perceived attributes in all innovations that help to explain and moderate the rate of adoption of innovations: advantage, compatibility, complexity, trialability, and observability. Even though the five perceived attributes govern the rate of adoption of innovations, the first two, relative advantage and compatibility, carry the most weight in the determination of the rate (Rogers, 2003). Complexity, trialability, and observability carry less weight, with increased complexity actually having a negative effect on the rate of adoption.

Davis (1986) introduced the TAM and posited that two other perceived characteristics or factors influence technology adoption: perceived usefulness and perceived ease of use. According to Davis (1989), "A system high in perceived

usefulness…is one for which a user believes in the existence of a positive use-performance" (p. 320). Davis saw perceived usefulness as the belief that people use to measure how a given technology will help them to better perform their jobs. Davis also wrote, "All else being equal, …an application perceived to be easier to use than another is more likely to be accepted by users" (p. 320). The TAM suggests that these two factors play a significant role in determining how and when an innovation is adopted (Kowatsch & Maass, 2010).

Innovations Adoption, Decision Process, and Diffusion Networks

Rogers (2003) found that central to the diffusion process is "modeling and imitation by potential adopters of their network partners who have previously adopted" (p. 19). Like Tarde (1890/1903), Rogers asserted that imitation plays an important role in adoption decision making, noting that "people depend mainly upon a subjective evaluation of an innovation that is conveyed to them from other individuals like themselves who have already adopted the innovation" (p. 18). Similarly, Ryan (1948) studied data that "seems to show a demand for 'conviction' based on self-experience as well as skepticism of knowledge derived from the experiences of others" (p. 281).

In 2006, Charron et al. confirmed that the motivation to adopt innovations is strongly linked to "higher levels of trust for person to person (P2P) information sources" (p. 7). In their study on social computing trends, Charron et al. provided data indicating that trust in traditional media across all industries and institutions had dropped from 13% to 7%. On the Internet, trust was rising, mainly because of people's ability to obtain input on other people's experience and feedback from others via P2P networks and online

communities. Rogers (2003) wrote, “We emphasized the importance of inter-personal network influences on individuals in convincing them to adopt innovations…opinion leaders are individuals who lead in influencing others’ opinions” (p. 390).

Rogers (2003) defined opinion leadership as “the degree to which an individual is able informally to influence other individuals’ attitudes or overt behavior in a desired way with relative frequency” (p. 390). Opinion leaders have certain characteristics that attract community members and make them want to follow their lead. Several empirical studies have been conducted to help to define the characteristics of opinion leaders. Rogers summarized these findings and compared the characteristics of opinion leaders to those of followers. He commented, “Compared to followers, opinion leaders have greater mass media exposure, more cosmopoliteness, greater contact with change agents, greater social participation, higher social status, and more innovativeness” (p. 362).

Role of Social Influence in the Adoption of ESC

Three fundamental theories of adoption research, namely, diffusion of innovations theory, the TAM, and social influence theory, emphasize the significant role of social factors in individual adoption behaviors (Turner, 2007). With the diffusion of innovations theory, Rogers (2003) highlighted the importance of communication in the process of diffusion and adoption process. Rogers noted, “Diffusion is a special type of communication in which the messages are about a new idea. This newness in of the idea in the message content gives diffusion its special character…diffusion is a kind of social change” (p. 6).

The TAM (Davis, 1986) has made an important theoretical contribution to the current understanding of technology adoption. The TAM also has furthered the ability of researchers to explain the determinants that influence IT adoption, technology usage, and motivate social change. The TAM was theoretically based upon the TRA, developed by Ajzen and Fishbein (1975). Although Davis (1986) developed the TAM as a model for predicting user acceptance of computers, they also recognized that the TAM was limited in its ability to explain whether usage behavior is the result of by social influence or an individual's attitude toward using a particular technology or innovation. Malhotra and Galletta (1999) wrote, "[The] TAM is incomplete in one important respect: it doesn't account for social influence in the adoption and utilization of new information systems" (p. 1).

Davis, Bagozzi, and Warshaw (1992) determined that the TAM was lacking a construct for social influence and included a predictor to represent social influence in IT acceptance. The predictor was called subjective norm (SN) and became an accepted factor into later versions of the TAM. Venkatesh and Davis (2000) developed the TAM2, an extension of the original TAM, to account for the affects of SNs on technology adoption and usage. Further tests of the TAM2 provided strong evidence that social influence affected adoption and usage (Venkatesh & Davis, 2000; Venkatesh & Morris, 2000). According to Malhotra and Galletta (1999), Davis et al. (1989) noted that the limitations of the TAM might be addressed by "using an alternative theoretical basis for conceptualizing subjective norms, specifically in terms of Kelman's process of social influence (compliance, identification, and internalization)" (p. 1).

In contrast to other researchers, Vannoy and Palvia (2010) suggested that the "antecedents to social influence" are social action, social consensus, social cooperation, and social authority and that they "augment usefulness and ease of use" (p. 145). In their view, these four antecedents addressed the gap in the TAM explaining technology adoption in a social computing context. Vannoy and Palvia noted that prior technology adoption studies had "relied on TRA, wherein the [SN] construct plays a central role" (p. 151). They referenced the work of Schepers and Wetzel, who found "mixed and inclusive results in technology adoption studies utilizing the [SN] construct" (p. 151). Malhotra and Galletta (1999) wrote, when referencing Davis and others, that "they observed that the conceptualization of SN based on TRA has theoretical and psychometric problems" (p. 1).

Vannoy and Palvia (2010) posited that a model of the four antecedents of the social influence construct: social action, social consensus, social cooperation, and social authority, could augment the body of knowledge as well as account for the social influence effect on technology adoption. According to Vannoy and Palvia, "Social influence leads to technology adoption" (p. 149). They added, "Social influence results from the confluence" of the four related antecedents or phenomenon (p. 151).

The first antecedent, social computing action, was based upon Chapin's (1936) work on social theory and social action. Chapin noted that social action could be divided into two forms. The first form that Chapin considered was "planned social action directed towards a specific goal" (p. 1). The second form of social action emerged from the "unintended consequences that follow from interrelationships among the personal social

forces" (Chapin, 1936, p. 1). In the context of social computing, the actions performed using such technologies as social networks, mobile phones, wikis, or blogs, could be categorized as social actions.

The second antecedent, social computing consensus, was based upon Horowitz's (1962) seminal work on social consensus theory. According to Vannoy and Palvia (2010), consensus theory "states that an action is right if there is agreement from all people who are involved in a particular situation that it is right…in other words, there is a consensus of shared values and expectations" (p. 152). The theory supports the notion that groups are able to reach consensus once they are able to acknowledge differences of opinion and work reasonably toward resolution.

The third antecedent, social computing cooperation, is based upon Axelrod's (2000) cooperation theory, which explains the tension between the needs of an individual in the short term and the needs of the group in the long term. According to Vannoy and Palvia (2010), social computing cooperation means "participating in a way that is in the best interest of the group" (p. 151). The fourth antecedent, social computing authority, is based upon on the research of Zambrano (2000). The social theory of authority states that a relationship of authority exists when one person accepts the rules imposed by another person or group. Vannoy and Palvia (2010) extended the definition to social computing by stating that social computing authority exits when authority "imposed by the group supersedes traditional authority" (p. 151).

Role of Leadership Support and Organizational Commitment in the Adoption of ESC: Organizational Commitment via Management Intervention

In many organizations, the executive management team members (i.e., leadership) make the decision whether or not to invest in IT (Agarwal, 2000). Whether IT is being used to enable a specific competitive strategy or maintain operations, it has become an integral part of organizational infrastructures. Agarwal (2000) wrote, "Organizations (i.e., leaders and managers) make primary adoption decisions, yet it is individuals within the firm who are the ultimate users and consumers of IT" (p. 85). The question arises as to what organizational leaders can do to influence IT adoption, given the fact that individuals are ultimately the consumers of IT, exhibit different beliefs and intentions, and diverge in their adoption behaviors. Gallivan (as cited in Turner, 2007) argued that managerial interventions could be implemented to drive actions and apply resources to facilitate or expedite individual innovation adoptions.

Agarwal (2000) wrote that managerial interventions are "specific management actions and policies that are posited to influence technology acceptance outcomes through two mechanisms: a direct effect and an indirect effect mediated by beliefs and attitudes" (p. 99). Management interventions specifically targeted to match individuals' beliefs and values could amplify acceptance behaviors (Z. Zhou, Jin,Vogel, Fang, & Chen, 2011). Agarwal recognized the importance of management inventions, noting that the "one institutional factor that has received consistent attention in the literature as an important influence on technology adoption in organizations is managerial commitment and support" (p. 100).

Because managerial commitments between and among organizations often vary in approach and effectiveness, it is important to know the best practices for exemplifying commitment and support and how they are orchestrated to influence individual acceptance of IT. Agarwal (2000) suggested, "Technology acceptance can be facilitated by utilizing… interventions that directly affects beliefs, such as training and developing a learning culture" (p. 96). Comparatively, Venkatesh et al. (2002) found that interventions in the pretraining and training environments had a significant effect on user perceptions and was an important factor towards influencing technology acceptance and use. According to Agarwal (2000),

> Deliberate managerial action can have a profound impact on individual acceptance of technology. Managers can provide overt support through appropriate communications, they can ensure adequate resource availability through the provision of training and other means of support, and they can structure systems development efforts to guarantee close interaction between technology providers and technology users. (p. 101)

Agarwal (2000) suggested that managers encourage a workplace culture of experimentation, continuous learning, and knowledge sharing. Nonetheless, encouragement of these behaviors requires that management team members be able to forgive mistakes and understand the experimentation process, especially during employee performance evaluations, which can be a powerful tool in communicating and directing organizational adoption decisions and influencing employee behaviors (Yuan & Woodman, 2010).

Role of Opinion Leaders, Change Agents, and Champions in the Diffusion and Adoption Process

In the context of leadership support and organization commitment, certain individuals possess characteristics and behaviors that can contribute significantly to the rate of diffusion and adoption of innovations by organizations. These individuals are sometimes referred to as opinion leaders. According to Rogers (2003), "Opinion leaders provide information and advice about innovations to many other individuals in the system" (p. 26).

Opinion leaders are viewed as knowledgeable and credible individuals within a social system, yet they are not necessarily the most innovative individuals within the system. Those who are highly innovative often are perceived as deviants within the social system and have a lower credibility status (Rogers, 2003). Hence, the ability of the deviants to influence or convince others to adopt given innovations is lower than that of the opinion leaders. A key point to be made about opinion leaders is that their role is not related to a formal position or function within a social system. Opinion leaders earn their status by acquiring technical skills and knowledge that make them accessible, thereby allowing them to frequently communicate their views, become the center of interpersonal networks, and conform to the social norms of the system (Rogers, 2003).

Other influential leaders in a social system are change agents. They are different from opinion leaders in that they are professionals within organizations who have the role of influencing diffusion and driving organizational change. Change agents are generally well-educated, highly trained, and technically degreed individuals whose main role is to

facilitate and promote innovations to others. They provide a communication pathway between the change agency (i.e., decision makers or group members who desire the implementation of the innovation), and the clients (i.e., those who must adopt and use the innovation; Rogers, 2003).

According to Rogers (2003),

> A change agent is an individual who influences clients' innovation-decision in a direction deemed desirable by a change agency. Change agents usually seek to obtain the adoption of new ideas but may also attempt to slow down diffusion and prevent the adoption of undesirable innovations. (p. 27)

Champions are individuals within organizations who use personal charisma, status, and influence to overcome resistance to innovations. Like change agents, champions possess a "linking position" (Rogers, 2003, p. 415) within organizations, have highly technical and analytical skills, and leverage their interpersonal skills to influence others. Like opinion leaders, champions are effective when communicating with people; they use their persuasion and negotiation skills to promote new ideas.

Impact of Organizational Structure on the Diffusion and Adoption of ESC

Rogers (2003) hypothesized that innovations can have as much impact on the behaviors of organizations and their structures as the organizations' structures can have on innovations. In some cases, innovations can influence the ways in which organizations make decisions, particularly with social analytics tools. In other cases, organizations are structured around innovations involving distributed operations and maintenance teams who support social computing applications and infrastructure environments.

Rogers (2003) stated, “Implementation of an innovation in an organization amounts to a mutual adaptation of the innovation and the organization” (p. 424). Thus, many innovations require either modifications to organizations in the form of realignments of organizational structures or transformations in organizational practices, or modifications of the innovations themselves, to adapt to the organizational structures (Rogers, 2003). Rogers noted that realignments of organizations around innovations are important to the diffusion and adoption of innovations. He hypothesized that organizational members are more inclined to adopt innovations if they feel that the innovations were derived from and developed within their organizations.

By the 1970s, research was being conducted on the relationship between organizational innovativeness and structural characteristics. Rogers (2003) found that individual (leader) characteristics, internal organizational structural characteristics, and external characteristics of organizations govern organizational innovativeness. To Rogers, individual leader characteristics included the leaders’ attitudes toward change. Rogers found that leaders’ attitudes toward change related positively to organizational innovativeness.

The internal organizational structural characteristics included the following IVs: centralization, complexity, formalization, interconnectedness, organizational slack, and size. Rogers (2003) defined centralization “as the degree to which power and control in a system are concentrated in the hands of a relatively few individuals” and “found [centralization] to be negatively associated with innovativeness” (p. 412). When power

and control are concentrated in hands of a few individuals, whether executives or leaders within the organization, the tendency is toward less innovation.

Complexity, defined by Rogers (2003) as "the degree to which an organization's members possess a relatively high level of knowledge and expertise, usually measured by the members' range of occupational specialties and their degree of professionalism (expressed by formal training)" was found to be related positively to innovativeness (p. 412). Rogers noted that sense of "value of innovations" (p. 412) is encouraged by the complexity of organization's members. Formalization, defined by Rogers as "the degree to which an organization emphasizes it members' following rules and procedures" (p. 412), was found negatively related to innovativeness. For example, in bureaucratic organizations, formalization inhibits new ideas, new ways of thinking, and stifles creativity. Interconnectedness, defined by Rogers as "the degree to which the units in a social system are linked by interpersonal networks" (p. 412), was found to be positively related to innovativeness. Interpersonal networks facilitate the greater flow of ideas among members of organizations (Datta, 2011).

Organizational slack, defined by Rogers (2003) as "the degree to which uncommitted resources are available to an organization," also was found to be "positively related to organizational innovativeness" (p. 412). Organizational slack is important because it provides an organization with the capacity for greater flexibility and staffing options. Organizational size also was found to be positively related to innovativeness. Rogers hypothesized that this might have been the result of larger organizations having greater slack resources. The external characteristic of the organization, which includes

"system openness," was found positively related to organizational innovativeness (Rogers, 2003, p. 411).

Parameswaran and Whinston (2007) found that organizations, especially online communities, that have embraced social computing platforms have experienced "significant unpredictability in the system" resulting from decentralized community activities and "grassroots innovation" (p. 339). Parameswaran and Whinston wrote, "Social computing platforms have introduced a highly unstructured model of computing," changing traditional governance structures that "serve to sustain organized action" (p. 340). Parameswaran and Whinston also stated that even though "governance structures do emerge" (p. 340) in social computing communities, "formalized governance structures are few, and even where they exist, they are far different from comparable structures in firms and institutions" (p. 340). The formalized governance structures found in communities "lack enforcement powers and it is convention, social norms, and collective agreement that sustain them rather than contractual rigor" (Parameswaran & Whinston, 2007, p. 340). Given the differences in types of governance structures found in online communities and classical organizations, the hypothesis could be made that the structural characteristics of formalization and centralization are negatively related to innovation adoption. In other words, the higher complexity, less formalization, and less centralization of online communities make them a suitable environment for initiating innovations.

Organizational Innovation Process

In the 1980s, IT innovations entered the marketplace., many of which were implemented with good success. New communication technologies like e-mail and management information systems were introduced to many organizations. Also during this period, many new IT innovations (e.g., video conferencing, mobile networking, etc.) failed to be fully implemented and adopted. As a result, a number of studies were conducted to better understand ways to introduce and implement IT effectively and increase its adoption rate (Rogers, 2003). Van de Ven, Angle, and Poole (1989) led a series of innovation studies, later known as the Minnesota studies, which "pursued a common theoretical framework in gathering and analyzing the data on the innovation process," according to Rogers (2003, p. 418).

From this body of work, Rogers (2003) developed a model of an organizational innovation process that had five main stages, including the main decision points and actions. According to Turner (2007), "Rogers [*sic*] organization innovation process, agenda setting and matching in the initiating stage paved the way for the organizational adoption decision" (p. 59). The adoption decision was identified in Rogers's model as a point in time that occurs after the organization completes the agenda-setting and matching stages.

The agenda-setting and matching stages, when taken together, form the initiation phase, which Rogers defined as "all of the information gathering, conceptualizing, and planning for the adoption of an innovation, leading up to the decision to adopt" (p. 420).

The remaining three stages, namely, redefining/restructuring, clarifying, and routinizing, make up the implementation phase, which Rogers (2003) defined as "consisting of all of the events, actions, and decisions involved in putting the innovation to use" (p. 421). Figure 5 represents Rogers's innovation process in an organization and describes the activities that occur at each stage.

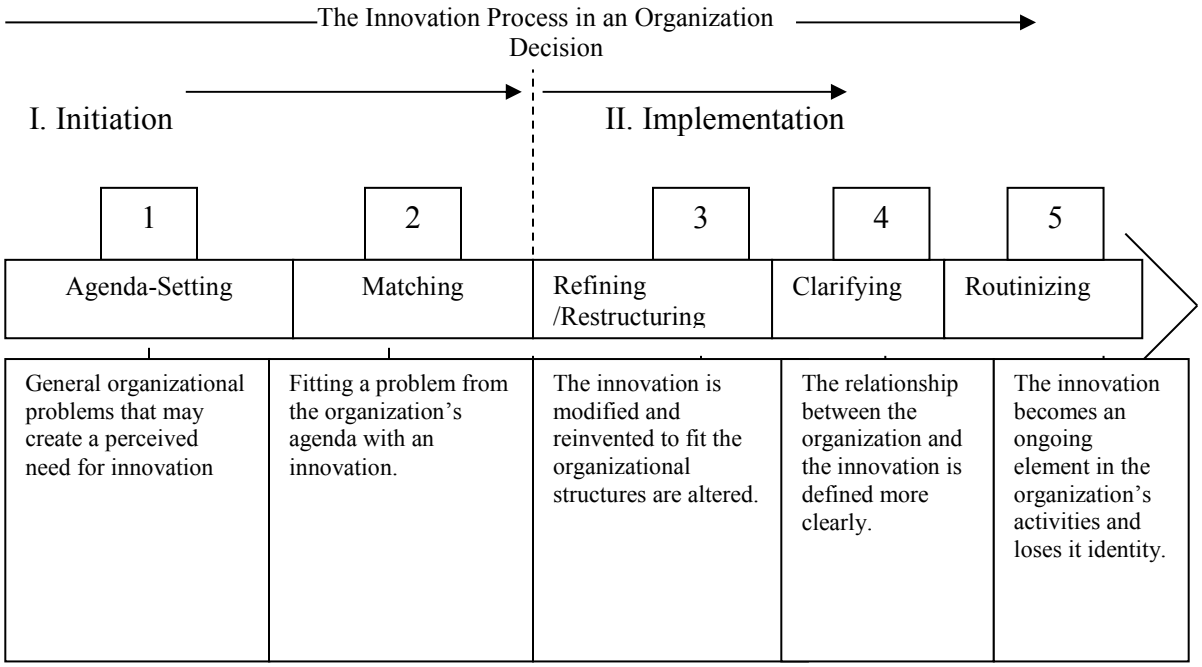

Figure 5. Five stages in the innovation process in organizations. Adapted from "Diffusion of Innovations" (5th ed.), by E. Rogers, 2003, p. 421. Copyright 2003 by Free Press.

The Role of Social Influence in IT Adoption

A meta-analysis by Y. Lee et al. (2003) found that "social influence plays a crucial role in human behavior and decision making [Ajzen, 1991; Barki & Hartwick, 1994; Taylor & Todd, 1995b]"…and "while the TAM studies attempted to investigate the effect of social influence on the technology acceptance, results were mixed" (p. 767). Davis et al. (1992) found weak relationships between social norms and other variables, but Moore and Benbasat (1991) found more significant relationships. Such variations in

findings suggested the need for further studies to understand the role of social influence on IT adoption.

One approach toward improving the ability of the TAM to predict IT acceptance was to insert the construct of social influence into the TAM. According to Y.-H. Lee et al. (2011), "Some studies attempted to include social influence into the TAM and to start finding boundary conditions that affect the significance of social influence" (p. 767). Vannoy and Palvia (2010) used another approach to develop social constructs (i.e., TRA and TAM) from theoretically grounded models to establish a new model for IT adoption.

Issues and Limitations Relevant to Adopting ESC

Although organizational use of social computing has increased significantly over the past 10 years, in some cases, it is creating serious issues for organizations. Parameswaran (2007) wrote, "Social software raises the possibility of malicious or criminal communities which use the anonymity, fault-tolerance, robustness, and low cost of online communities to build very effective platforms for interaction, communication, and knowledge sharing, while flying under the radar" (p. 773). Controlling against such behaviors and practices is a growing concern for most organizations. The human resources and costs associated with protecting private networks, intellectual property, and organizational data are increasing dramatically (Bennett, Owers, Pitt, & Tucker, 2010; Ramerita, Kirchner, & Nabeth, 2014). Countermeasures to security threats and criminal online activities have been employed by organizations; in some cases, law enforcement professional have been engaged to help to apprehend and incarcerate the individuals engaged in the malicious or criminal activities that impact these organizations.

For some organizations, security concerns associated with social computing have led to rejection of its adoption. Many of these organizations prefer to wait until they have no other choice rather than deal with the myriad of security measures required to safeguard their intellectual property, networks, and data. For other organizations, the security concerns and the perception that social computing is not a productive platform do not justify the ROI. Organizations that have focused upon productivity and performance have argued that the 'soft' collaborative advantages afforded by social computing have not justified the significant investment required in infrastructure, human resources, and operational support.

A growing number of successful cases studies have suggested that the ROI for social computing is significant (Hinchcliffe, 2009). According to Duta and Fraser (2009), "Indeed, a solid ROI case can be made for Web 2.0 branding strategies" (p. 44). An extensive survey within the IBM IT community indicated that social computing provided significant business advantages (Azua, 2010). The IBM survey results provided evidence of significant improvement in productivity, reduced IT costs, and increased revenue.

One limitation with social computing is the inability of organizational managers to control the volume and content of data and comments on blog sites; podcasts; webcasts; instant messaging; and mobile peer-to-peer messaging services (e.g., texting). The popularity and importance of these software tools are driving the adoption rate of social computing (West & Mace, 2010). In addition, the unpredictability and loss of control associated with these software tools are becoming a growing concern to many

organizations (Von Krogh, 2012). For example, the premature release of new product or service data has occurred without management authorization or awareness.

Whether the release of information is accidental or maliciously motivated by employees or community members, the impact on organizations can be devastating. In addition, Warr (2008) identified breach of privacy as a major issue associated with social computing. Protection of private data, especially for organizations that manipulate, manage, and store health and insurance data is at high risk.

Another major limitation of social computing is the lack of strong governance structures (Parameswaran & Whinston, 2007). In contrast to organizations, which rely on hierarchical governance structures to execute their mission and sustain the organization's actions, social computing communities rely mostly on reputation systems. In some online social communities, governance structures develop, but more often than not, these structures emerge rather than being created by deliberate design (Parameswaran & Whinston, 2007).

A reputation system generally allows members of social communities to rate each other based upon the quality of the contributions made by each member. The members' rating histories determine their reputations in the communities. A well-known website that uses a reputation system is Wikipedia, whose primary function is to provide detailed information and facts on diverse subjects. The website is basically a large electronic encyclopedia, but the content is provided solely by a community of volunteer online contributors. Each topic is an electronic wiki that can be edited correctly by the community of users. The governance structure that has emerged on the Wikipedia

website is both a democracy and a meritocracy (Parameswaran & Whinston, 2007). Each member of the Wikipedia website can veto the contributions of others, and the ratings among the contributors determine administration rights.

Wikipedia, along with other open source websites, also "exhibit[s] traits of meritocracy" because some contributors establish a reputation based upon their leadership skills and qualified opinions (Parameswaran & Whinston, 2007, p. 340). Those who demonstrate such leadership abilities and become respected in the community for their knowledge and opinions have been identified by Rogers (2003) as opinion leaders. Although opinion leaders are influential in convincing others to adopt an innovation like Wikipedia, they lack enforcement powers to formalize the governance structures established by social computing communities. Rather, the social norms and collective agreements of the online community members sustain the structures and govern the behaviors of its members (Parameswaran & Whinston, 2007).

Consequences of Innovations and Adoption

To date, researchers have explored the factors influencing the diffusion and adoption of ESC, the decision-making process, models for adoption, and the advantages and limitations of its use. Researchers also must consider the consequences to organizations that choose to implement ESC. In spite of research pointing to the potential of ESC to improve productivity, reduce IT costs, and increase revenue, the consequences to organizations of implementing ESC also can be significant. As Rogers (2003) noted, "We cannot predict when and how consequences will happen. The unpredictability of an innovation's consequences, at least in the long term, is one important type of uncertainty

in the diffusion process" (p. 436). Given the significant investment costs in human resources and infrastructure, organizations must carefully consider not only the ROI but also the impact of social computing on its values, beliefs, and workplace culture. With many changes at the enterprise level, there is an assumption that the adoption of innovations will produce beneficial results for organizations. Rogers called this assumption "the pro-innovation bias" (p. 436).

The desired results might take much longer than expected to produce, or they might not be produced at all. For instance, in 2010, IBM deployed Lotus Connections version 3.0 (LC v3.0), a social computing platform, across 32 high-speed, large-capacity virtualized servers. The deployment costs were several million dollars, and the project required nearly 1 year to plan and implement. The social platform was deployed and was made available to more than 400,000 global employees. The executive leadership expected that adoption of the LC v3.0 would be immediate, given that a previous pilot version, LC v. 2.5, had been deployed with good success and usage, even though the adoption rate of the LC v3.0 was much slower than anticipated, impacting productivity and IT cost reductions.

The executive team members were left wondering what was causing the slow adoption rate. After compiling the results of a survey of IBM employees and receiving feedback from internal blogs, the executive leadership team learned several important lessons. First, the skill levels of the user community did not match the leadership expectations for the newer version. The new version provided increased functionality and

productivity enhancements, but the education and knowledge levels of the user community were inadequate to meet the executive leadership team's expectations.

Hinchcliffe (2009) identified this as the primary issue in adopting ESC. He described it as a "lack of social media literacy amongst workers" (p. 3). Hinchcliffe also noted that employees who had not been intimately involved in updating wiki sites, creating profiles, uploading community file, and so on, often were poorly prepared to "achieve effectiveness" with social computing tools (p. 3). The survey and feedback results revealed that the organization's proponents of social computing had set unrealistic expectations. Azua (2010) remarked, "Overly enthusiastic expectations are often referred to as the "hype" associated with a new technology. It is crucial for a business to recognize the reality and influence of hype if it is to be successful in its innovation efforts" (p. 185). At times, organizations have profited from the "hype" created around a product or service, but buildup associated with a new technology can sometimes lead to disillusionment or a reassessment of expectations.

The Hype-and-Adoption Cycle

In 1995, Gartner, Inc. developed the hype cycle model to help customers differentiate between investments that were considered "hype" versus those that had demonstrable value. Several years later, Fen and Raskino (2008) found that early adopters tended to overestimate the true value of innovations and that this tendency led to innovation "hype." Fen and Raskino identified five periods in the hype cycle. The technology trigger period ignites an explosive and steep rise in interest and expectations.

After some time, this peak is achieved, but soon after, interest begins to fade, and the expectations are no longer being met.

As interest decreases, disillusionment sets in. During this period, the organization and its leaders begin to reassess the value of the innovation and realize the magnitude of the unrealistic expectations. As the organization enters into the disillusionment period, there is a tendency by its members to overcompensate on the level of disillusionment, which prolongs the period. After the value of the innovation is reassessed, rebounding occurs as the organization establishes more realistic expectations. Once expectations are adjusted, the slope of enlightenment period begins, and the organization and its leaders begin to realize greater productivity and value from the innovation. Figure 6 represents the Gartner hype cycle (as cited in Azua, 2010).

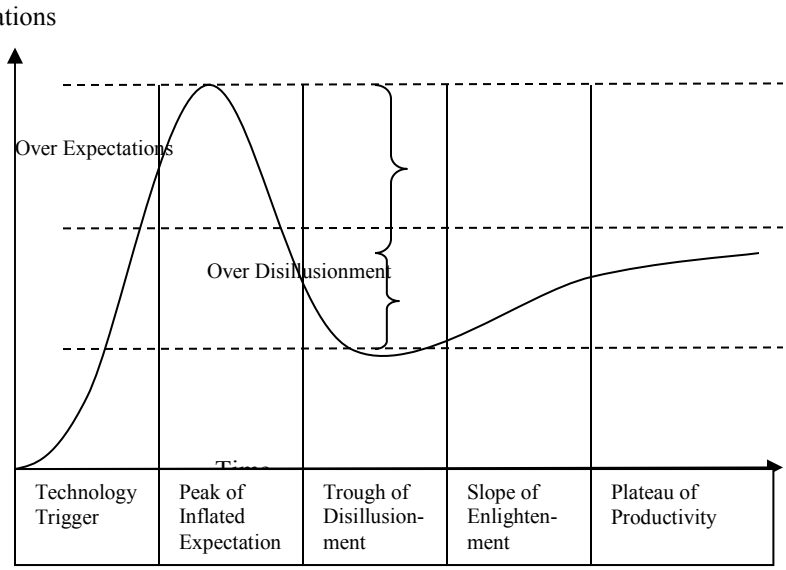

Figure 6. The hype cycle. Adapted from "The Social Factor," by M. Azua, 2010, p. 186. Copyright 2010 International Business Machines Corporation.

Along with the hype cycle runs the natural process of the adoption cycle, which is characterized by a normal bell-shaped curve. Azua (2010) identified three personality

types that influence the adoption cycle: early adopters, mass-market adopters, and laggard adopters. In comparison, Rogers (2003) identified five personality types: innovators, early adopters, early-majority adopters, late-majority adopters, and laggard adopters. Rogers also noted that even though some researchers have argued that there are discernible breakers or "discontinuities" in the personality types, "past research shows no support for this claim" (p. 282). Despite no clear breaks, there are important distinctions in each personality type. Innovators are characterized by their passion for new ventures and involvement in actions supporting new ideas, even when there is a great deal of uncertainty about the innovations (Rogers, 2003). Rogers found the innovators are important to the diffusion process because they are critical in "launching the new idea into the system" and bringing in the necessary resources to support it (p. 282).

Early adopters are the change agents who are sought after by members in communities or organizations for their views and opinions about innovations. Rogers (2003) noted that early adopters "serve as a role model for many other members of a social system"…and…" the early adopter is respected by his peers, and is the embodiment of successful, discrete use of new ideas "(p. 283). Because early adopters are seen as rational decision makers in the social system, their adoption of innovations can lead to a decrease in the level of uncertainty associated with the innovations (Luo, Li, Zhang, & Shim, 2010).

Early-majority adopters, who are between early adopters and late-majority adopters in the adoption cycle, make up approximately one third of all adopters. They like to deliberate on their adoption decisions and rarely try to overtly convince others to

adopt innovations. Because the early majority do interact frequently and communicate often with others, they tend to help diffuse an innovation.

Late-majority adopters are characterized as being cautious and requiring ample information before making adoption decisions. Their numbers equal those of the early-majority adopters in a social system, but they need to be convinced of the benefits before deciding to adopt the innovation. Rogers (2003) stated, "Most of the uncertainty about a new idea must be removed before the late majority feel that it is safe to adopt" (p. 284).

Laggards are the last to adopt new ideas because of their deep skepticism about innovations and those who promote them. The decision-making process of laggards is much longer than those of the other four personality types, and their resistance to change can be an impediment to the adoption of innovations. Laggards generally are characterized as less aware of and uninformed about innovations and their benefits.

The Value of Social Computing

ESC has changed the manner in which businesses and clients communicate, collaborate, and create strategic value (Carroll, 2010; Li, Nagel, & Sun, 2011). ESC enables users (i.e., employees, business partners, and clients) to obtain timely and accurate information, engage in online conversation, contribute to online communities, and give feedback on products and services (Chih, Wang, Hsu, Huang, 2013; L. Zhou, Zhang, & Zimmermann, 2013). This new application of information technology has forced companies to change past management practices and adopt new customer- and community-oriented business strategies. In the process, ESC has created both perceived and real strategic value, causing disruption to past social behaviors, and forever changing

the manner in which people communicate within and outside of the organization (Christensen, 1997).

As ESC has evolved, it has had to overcome user perceptions in order to be fully adopted as a strategic communication and technology platform for creating business value. Initially, many executives and managers perceived ESC as a time-consuming and nonproductive communication technology that added little legitimate value to their business enterprises. They perceived ESC technologies as too costly to implement, control, and monitor. In particular, concerns surrounding security, productivity, and ROI made acceptance a steep hurdle to overcome (Baxter, 2015). Many organizations (e.g., MySpace, Twitter, and Facebook) restricted employees from accessing social networking sites (Carroll, 2010; Gosling, Augustine, Vazire, Holtzman, & Gaddis, 2011; Li et al., 2011).

Executives feared that employees could divulge corporate secrets or sensitive data that would potentially give their competitors a strategic advantage (Andriole, 2010). In addition, executives were concerned with maintaining control over their organizations' corporate images and brands. They were especially concerned with employees speaking freely on social networks or sharing their thoughts with online communities (Joseph, 2012).

Today, ESC is revealing a compelling value proposition only once imagined and articulated by past advocates (Lehmkuhl & Jung, 2013). The value of ESC has evolved into five forms, namely, experiential, informative, transactional, strategic, and transformational, and executives are quickly looking to capitalize on its potential. Each

form of value, whether real or perceived, has forced organizations and society to reimagine the power of ESC as a vehicle for connecting individuals to one another and the products and services that they use every day (Wang et al., 2012).

Experiential value is created and perceived when individuals obtain enthusiastic feedback for information shared with others in a group, community, through business transaction (Grönroos, 2012). In addition, experiential value is created in the form of recognition or sense of belonging to a group of like-minded individuals. Positive psychological reinforcement and a sense of belonging to a group can engender and inspire individuals to contribute and share information within a group or a community (Cheung & Lee, 2010; Guadagno, 2013). ESC creates experiential value by promoting social relationships, groups, and communities, where they might not have formed by more traditional means (Kim, Kim, & Nam, 2010; Ledbetter et al., 2011). In a study by Hsiao, Lee, and Yen (2014), experiential value was found to be significant and had a particularly large impact among university students who shared information on social networking services, two examples of which are Facebook and Twitter. Shamin and Ghazali (2014) found that experiential value can be created in communities whose members engage in and experience compelling dialogue about "customer perceptions" and "about an environment, product, or service, based on their interactions either direct usage or indirect observations" (p. 188). The condition can take the form of a product or service enhancement, improved customer experience, or reduction of cost.

Informative value is created from the sharing of information, knowledge, and new ideas among individuals, organizations, and communities. By virtue of the Internet, social

networks, and social software technologies, individuals now have a rich platform from which they can collaborate within and across enterprises to generate new ideas and create innovations (Kaplan & Haenlein, 2010; Shneiderman, Preece, & Pirolli, 2011).

Organizations that thrive on innovation are quickly leveraging social computing technologies to extract ideas and knowledge created by the collaborative interactions of their employees. They are using newly formed ideas to create a competitive advantage and increase market share. In addition, these organizations recognize that social computing has a significant ability to create informative value by supporting the interaction between members of the organization and its customers. Social networks, social media, and social mobile platforms are the perfect means by which organizations can reach out and communicate with their customers (Fun & Wagner, 2008). They reap not only the benefits of information-enhanced relationship but also add cocreated transactional value (Fun & Wagner, 2008).

Although cocreation, or the joint creation, of transactional value between businesses and customers is not a new concept, it has seen a significant increase as the result of expanded use of ESC technologies (Baxter, 2015; Scaraboto, 2011; Shuen, 2008; J. S. Hsu, Hung, Chen, & Huang, 2013). The cocreation of value places equal weight on the role of customers during the cocreation process (Scaraboto, 2011; Shamin & Ghazali, 2014). The cocreated experience can take the form of improved ROI, service experience, product aesthetics, and enhance playfulness (Shamin & Ghazali, 2014).

Social computing technologies create transactional value by enabling and motivating the buying and selling of goods and services among individuals and

organizations (Hsiao et al., 2014). Advocates of social computing, particularly marketing organizations, often promote the capability of social computing to increase transactional value. In addition, social computing enriches the customer experience and supports sustained user relationships (Cortimiglia, Ghezzi, & Renga, 2011). In particular, social computing technologies (e.g., web blogs, social networks, and instant messaging) are being used to enhance customers' awareness of special price offers, communicate quantity discounts, and increase sales.

Today, most popular commercial websites on the Internet are either linked to popular social websites or have some form of embedded social functionality that allows customers to engage with company representatives or organizations that manage the websites. This approach benefits bought customers and companies. Customers are given a voice and offered a forum to articulate their likes, dislikes, or raise questions regarding given products or services. In turn, company representatives engage in important conversations with the customers and can leverage the communication to either improve the products or services or increase the sales opportunities through the enhanced customer-company relationships.

The relationships forged by company representatives and customers also hold strategic value for the companies. Trust occurs when open and honest exchanges take place between customer and company representatives that are facilitated by the use of social technologies (Beldad, De Jong, & Steehouder, 2010; Shin, 2013). Hsaio et al. (2014) noted that trust is central to the process of exchanging useful information and knowledge. Customers whose trust has been gained by company representatives are more

inclined to share information as well as recommend and promote the companies' products and services (Blanchard, 2011; Geczy et al., 2014; Shin, 2013).

Building trust and strategic value also extends inward toward companies or organizations, and it increases the sharing of knowledge and encourages cooperation among the members (Hsiao et al., 2014). Li et al. (2011) noted that social computing technologies enable value creation by breaking down past archaic information management practices (i.e., silo-based information systems) and supporting more communicative and participatory practices. Furthermore, Li et al. found that social computing facilitates knowledge transfer across organizations and into communities of knowledge.

Transformational value also is created via social computing because it enables organizations to move away from archaic knowledge management practices and toward cross-functional communities of knowledge. Within these online communities, information is shared, and participating members process ideas (T. Zhou, 2011). Furthermore, within communities of knowledge, actions are mobilized by the members for the good of the communities and the participating organizations. In this paradigm, the members of the communities support and reinforce good ideas and volunteer to ensure the success of the organizations. Cooperation and collaboration are natural expressions of the communities and their desire to see knowledge grow and good ideas flourish (Fun & Wagner, 2008; C.-L. Hsu & Lin, 2008). In turn, organizations benefit by eliminating barriers to communication, increasing innovations, and creating greater potential for successful outcomes.

ESC, as with most paradigm shifts, is disrupting many past management practices, social behaviors, and work environments (Carroll, 2010). The impacts are being felt by individuals, organizations, and society as a whole. Some executives have contended that ESC is time-consuming, costly to implement, and nonproductive; but the value proposition that ESC holds is extremely compelling (Tynan, McKechnie, & Chhuon, 2010). Proponents of ESC have argued that the technology has the means to change the business and communication landscape, and in doing so, create significant value in return (Li et al., 2011). Gains in the form of experiential, informative, transactional, strategic, and transformational value are being experienced at every level of the organization and society (Shadkam & O'Hara, 2013). Companies like Facebook, LinkedIn, Twitter, IBM, Microsoft, Google, Apple, and so on, are reaping huge financial and social benefits by adopting and promoting the use of ESC technologies (Katona, Zubcsek, & Sarvary, 2011).

Between 2009 and 2010, Bradley and McDonald (2011) examined more than 400 cases to determine how companies were using ESC to create business value. Sales effectiveness and operational effectiveness were the leading categories of business value. These two categories encompassed 40% of all cases; the remaining 60% were divided among the categories of customer and market responsiveness; product service development; customer service; product and service delivery, utilization and engineering; and social learning, project management, and sales execution (Bradley & McDonald, 2011).

At the level of the individual, costumers and users have significantly greater access to information and connectivity to people and communities than they did in the past. Society as a whole has increased in size, but human beings are more informed and connected than in any time in recorded human history. It is true that ESC has introduced several undesired social behaviors (e.g., increased numbers of car accidents because of user texting while driving, predatory online behaviors, bullying, etc.). Regardless, the potential for ESC to improve society and create real quantifiable value is significant and warrants serious consideration by individuals, organizations, and society.

Enhanced ESC Value Creation

Underlying the motivation for ESC initially was the opportunity to reduce transaction and communication costs. Early advocates for the adoption of ESC promoted the potential for social and collaborative platforms to reach across geographical boundaries and bring people together without the physical challenges experienced by traditional forms of communications (e.g., face-to-face conferences, meetings, etc.). Over time, the ESC value proposition evolved to offer new avenues for cost reductions in the areas of integration, marketing, human resource, and customer support, and new strategic opportunities for businesses (Li et al., 2011).

The integration and consolidation of many Web-based business tools gave rise to sophisticated social and collaborative work platforms like Microsoft Sharepoint, IBM Connections, and Facebook. Integrated social and collaborative platforms enable individuals not only to communicate but also form communities of practice, share and create knowledge, and seek out and obtain information and human resources more

effectively and efficiently than in the past (Lehmkuhl & Jung, 2013). Today, hospital patients are now using microblogging social software tools to obtain advice and medical treatment options from members of the online health care community (Baxter, 2015). Doctor also are using microblogging to reach out to their patients and share the latest research findings and new medical procedures.

Maintaining and acquiring new customers is a critical activity for generating sales in every company. Traditionally, marketing organizations have used television, radio, news, and magazine channels as their primary advertising media to generate customer demand. In the late 1990s, when marketing organizations became aware of the efficiency offered by ESC to reach vast numbers of potential new customers, they quickly shifted their business activities to the platform (Blanchard, 2010). In 2010, a study by the University of Massachusetts found that most social media marketing organizations were reporting successful results (as cited in Hinchcliffe & Kim, 2012). Brito (2012) noted that marketing was not only made more efficient by virtue of ESC but also that marketing via ESC platforms demonstrated value in ways not measured in monetary terms.

When considering the process of hiring human resources, ESC can significantly increase the ability of human resource professionals to find, screen, and retain needed resources for their businesses. Popular social network sites allow individuals to post their résumés and profiles, making it easy and less costly for professional recruiters and human resource personnel to obtain important data that can influence their hiring decisions. ESC allows human resource professionals to perform database searches quickly and find information related to candidates' skills, social behaviors, and affiliations. A keyword

search on LinkedIn can provide recruiters with the ability to see potential candidates' photos, detailed résumés, blog and forum postings, and customer endorsements. In addition, marketing via ESC can add business value by increasing the potential to gain new customers, improve product or service branding, and increase customer awareness (Brito, 2012; Shadkam & O'Hara, 2013).

Online Social Influence

The theory of social influence postulated that influence changes the attitudes and actions of individuals through three instinct processes: compliance, internalization, and identification (Kelman, 1958). The theory has endured over time and has been cited frequently by social scientists and psychologists. In the online world, social scientists continue to study whether other factors or principles are influencing individuals and causing changes in their attitudes, behaviors, and beliefs (Kowai-Bell, Guadagno, Preiss, & Hensley, 2011; Metzger, Flanagin, & Medders, 2010; Utz, 2010).

Cialdini identified six principles of online social influence, scarcity, reciprocity, consistency/commitment, authority, social validation, and friendship/liking, that are present in all influence attempts online (Guadagno, 2013; Guadagno, Muscanell, Rice, & Roberts, 2013). Guadagno (2013) determined that the "effectiveness of online influence attempts depends on factors such as gender of the interactants and whether the specific processes behind the influence tactic employed is effective more due to internal or interpersonal factors" (p. 321). Comparatively, Kimbrough, Guadagno, Muscanell, and Dill (2013) found that women use mediated social communication tools (e.g., text messages, social media, online video calls, etc.), more frequently than men do. These

results supported Guadagno's hypothesis that gender is a factor and suggested that social influence is having a significant impact on women's use and adoption of social computing technologies (Ardolino, 2013; Muscanell & Guadagno, 2012).

A growing body of literature on the affects of social influence in online networks has found significant findings on the collective behaviors induced by application-rich social networking environments (Bond et al., 2012; Guadagno, Okdie, & Muscanell, 2013; Ledbetter et al., 2011). Onnela and Reed-Tsochas (2010) studied the emergence of social influence on Facebook to understand how collective behaviors are induced by this very popular and heavily used application (i.e., more than 100 million registered users). The researchers found that two distinct sets of behaviors emerge in large-scale online social networking systems. First, the collective effect of social influence has little to no impact on application technology adoption when the application's "threshold of popularity" is not achieved (Onnela & Reed-Tsochas, 2010, p. 18375). Second, after the application reaches the threshold, social influence processes take affect and accelerate the technology adoption to "extraordinary levels" (Onnela & Reed-Tsochas, 2010, p. 18375).

Onnela and Reed-Tsochas (2010) noted that the rate of adoption is highly correlated to social influence processes. Comparatively, Bond et al. (2012) observed that online messages can socially influence users and their friends and increase the adoption rate. These findings support Rogers's (2003) earlier findings that the rate of adoption of an idea is enhanced by the efficiency of the communication channel. Online social networks can provide users with the capability to accelerate social transmissions (i.e., message content) between and among individuals and amplify the affects of social

influence on a broad spectrum of areas ranging from the diffusion of online musical tastes to technology adoption (Lewis, Gonzalez, & Kaufman, 2012; Guadagno, Cialdini, & Evron, 2010).

Message content (i.e., text, audio, video, presentations, etc.), although not a social influence principle, can create influence and can play an essential role in the creation of value in the online and offline worlds (Guadagno, Muscanell, Sundie, Hardison, & Cialdini, 2013; Guadagno, Rempala, Murphy, & Okdie, 2013; Schaeffer, 2012). For many individuals in the social media marketing and political communication worlds, content is powerful and can compel others to share important, meaningful, and purposeful messages (Guadagno & Cialdini, 2010; Guadagno, Muscanell, & Murphy, 2014; Guadagno & Cialdini, 2010). Cialdini (as cited Schaffer, 2012) agreed that content creates value and stated, "It's true that with content, we create value because we give people access to insights they didn't have before" (p. 74). Schaeffer (2012), in contrast, found that content can create online social influence, regardless of an individual's skill level, intellectual capacity, or personal experience.

Summary and Conclusions

Among the key themes found in the literature, the following are considered the most significant:

- Social influence and perceived organizational innovation characteristics are the major contributing factors of technology adoption by members of organizations.

- Management interventions specifically targeted to match individuals' belief and values can amplify adoption behaviors.
- Opinion leaders, change agents, and champions are critical individuals who significantly contribute to the rate of diffusion and adoption of innovations within organizations.
- Innovations can have as much impact on the behaviors and structures of organizations as organizations' structures can have on innovations.
- Leaders' attitudes toward change are related positively to organizational innovativeness.
- Innovations are initiated in online communities because of higher complexity, less formalization, and less centralization.

The literature review explored the diffusion of innovations theory and IT adoption as well as inquired into the factors influencing the diffusion and adoption of ESC. In addition, the research described the perceived characteristics that are common to all innovations and how these perceived attributes can help to explain and moderate the rate of adoption. The TAM (Davis, 1989) was compared to previous empirical findings. The model holds two other characteristics that influence IT adoption: perceived usefulness and perceived ease of use. The innovation adoption discussion process was introduced, and the link between motivation and online trust was explained. The role of social influence in the adoption of ESC was described, and the relationship between the TAM and the SIM was compared to the empirical findings of other researchers.

Kelman's (1958) theories on social influence were explored, and the three processes of social influence (i.e., compliance, identification, and internalization) were defined and explained. The roles of opinion leaders, change agents, and champions were described, and their impact on the process of diffusion and adoption was discussed. Key to the discussion was the significant contribution of each role on the rate of diffusion and adoption of innovations by organizations.

Known factors of IT adoption, including social influence (i.e., social action, social consensus, social cooperation, social authority); organizational innovation characteristics (i.e., relative advantage, perceive compatibility, management support); and perceived ease of use and perceived usefulness, were described and explored. What remains unknown is the effect of different national cultures on the adoption of ESC (Vannoy & Palvia, 2010). Future researchers might be able to determine whether there are differences in the global adoption rates of ESC.

This study extended the SIM of technology adoption and operationalized the model. The operationalization and extension of the SIM to include the construct of organizational innovation characteristic extended the body of knowledge and added value to the user community. In Chapter 3, information about the operationalization of the constructs, the instrumentation used to collect the data, and the research design is presented.

Chapter 3: Methodology

Introduction

The purpose of this study was to test the ESIM of technology adoption (see Figure 7) related to the independent variables (IVs) of social action, social consensus, social authority, social cooperation, perceived relative advantage, perceived compatibility, organizational commitment, perceived ease of use, and perceived usefulness, and the dependent variables (DVs) of embracement and embedment. The IVs were the factors that influenced the C-level executives' decision making about the adoption of ESC. The DVs were the social effects that emerged as a result of IVs.

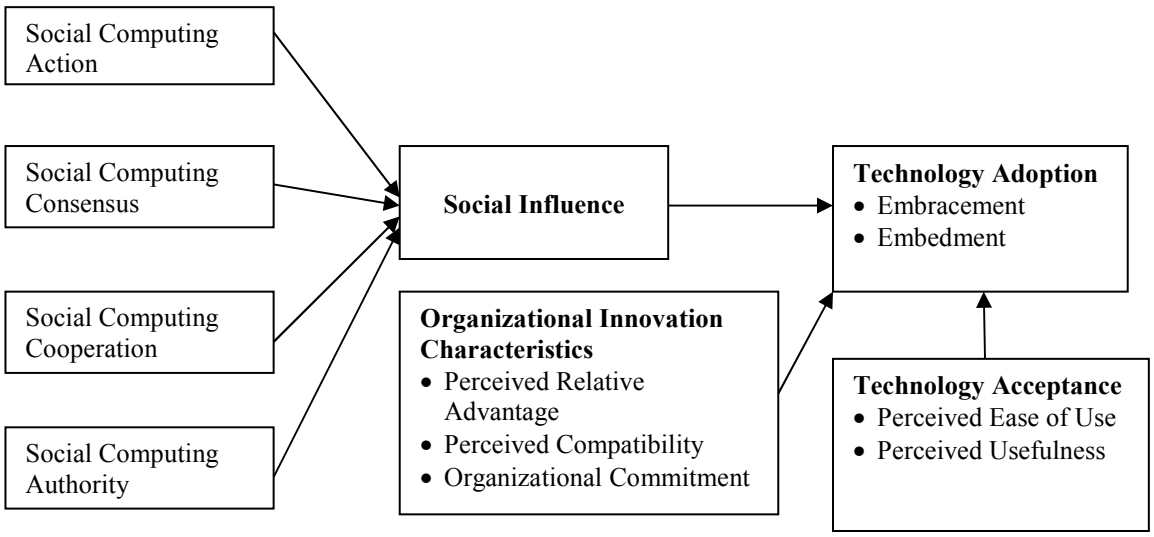

Figure 7. Research model: The ESIM of technology adoption.

Chapter 3 is divided into three sections. In the Research Design and Rationale section, I describe the variables, identify the research design, define the target population and the sampling and sampling procedures, explain the data collection procedures,

discuss the pilot study, and present the instrumentation and operationalization of the constructs. In the Threats to Validity section, I describe threats to the internal and external validity of the study, threats to construct or statistical conclusion validity, the ethical procedures related to data collection, and the treatment of the data. In the Summary section, I aggregate and synthesize the design and methodology components featured in the chapter.

Research Design and Rationale

Three research questions and their hypotheses guided this study. Hypotheses 4 and 5 are reserved for future inquiries.

Research Question 1: What are C-level executives' perceptions of social influence? The social influence construct related to four IVs: social computing consensus, social computing cooperation, social computing authority, and social computing action. In Hypothesis 1, each IV was tested against the DVs of embedment and embracement, respectively.

Alternative Hypothesis 1: The ESIM of technology adoption will result in the following significant relationships:

- H_{a1a}: There is a significant relationship between social computing consensus and embracement.
- H_{a1b}: There is a significant relationship between social computing consensus and embedment.
- H_{a1c}: There is a significant relationship between social computing cooperation and embracement.

- H_{a1d}: There is a significant relationship between social computing cooperation and embedment.
- H_{a1e}: There is a significant relationship between social computing authority and embracement.
- H_{a1f}: There is a significant relationship between social computing authority and embedment.
- H_{a1g}: There is a significant relationship between social computing action and embracement.
- H_{a1h}: There is a significant relationship between social computing action and embedment.

Null Hypothesis 1

- H_{01a}: There is no relationship between social computing consensus and embracement.
- H_{01b}: There is no relationship between social computing consensus and embedment.
- H_{01c}: There is no relationship between social computing cooperation and embracement.
- H_{01d}: There is no relationship between social computing cooperation and embedment.
- H_{01e}: There is no relationship between social computing authority and embracement.

- H_{01f}: There is no relationship between social computing authority and embedment.
- H_{01g}: There is no relationship between social computing action and embracement.
- H_{01h}: There is no relationship between social computing action and embedment.

Research Question 2: What are C-level executives' perceptions of organizational innovation characteristics? The organizational innovation characteristic construct related to three IVs: organizational commitment, perceived relative advantage, and perceived compatibility. In Hypothesis 2, each IV was tested against the DVs of embedment and embracement, respectively.

Alternative Hypothesis 2: The ESIM of technology adoption will result in the following significant relationships:

- H_{a2a}: There is a significant relationship between organizational commitment and embracement.
- H_{a2b}: There is a significant relationship between organizational commitment and embedment.
- H_{a2c}: There is a significant relationship between perceived relative advantage and embracement.
- H_{a2d}: There is a significant relationship between perceived relative advantage and embedment.

- H_{a2e}: There is a significant relationship between perceived compatibility and embracement.
- H_{a2f}: There is a significant relationship between perceived compatibility and embedment.

Null Hypothesis 2

- H_{02a}: There is a no relationship between organizational commitment and embracement.
- H_{02b}: There is no relationship between organizational commitment and embedment.
- H_{02c}: There is no relationship between perceived relative advantage and embracement.
- H_{02d}: There is no relationship between perceived relative advantage and embedment.
- H_{02e}: There is no relationship between perceived compatibility and embracement.
- H_{02f}: There is no relationship between perceived compatibility and embedment.

Research Question 3: What are C-level executives' perceptions of the acceptance of ESC? The social influence construct related to two IVs: perceived ease of use and perceived usefulness. In Hypothesis 3, each of the IVs was tested against the DVs of embedment and embracement, respectively.

Alternative Hypothesis 3: The ESIM of technology adoption will result in the following significant relationships:

- H_{a3a}: There is a significant relationship between perceived ease of use and embracement.
- H_{a3b}: There is a significant relationship between perceived ease of use and embedment.
- H_{a3c}: There is a significant relationship between perceived usefulness and embracement.
- H_{a3d}: There is a significant relationship between perceived usefulness and embedment.

Null Hypothesis 3

- H_{03a}: There is no relationship between perceived ease of use and embracement.
- H_{03b}: There is no relationship between perceived ease of use and embedment.
- H_{03c}: There is no relationship between perceived usefulness and embracement.
- H_{03d}: There is no relationship between perceived usefulness and embedment.

Hypothesis 4: There is a statistically significant relationship between organizations that use ESC and the rate of innovation, as measured by the number of patents.

Hypothesis 5: Organizations that adopt social computing will create more disruptive innovations than organizations that do not adopt social computing.

The overall objective of the study was to present empirical evidence to explain why some organizational leaders decide to adopt ESC and others hesitate to do so or reject its use. The research objective was accomplished by using several theories to derive testable hypotheses predicting adoption and to explain the research results.

Unit of Analysis

The unit of analysis for the survey design was each C-level executive who participated in the study. ESC was treated as the technological innovation, and the respondents' answers to the survey items reflected a range of decision-making choices for adoption of the innovation in a corporate environment. The results suggested that the variables of adoption in a social computing context will add new knowledge to the research literature.

A quantitative, online survey was used to collect data from randomly selected C-level executives from small, medium, and large commercial organizations. The quantitative analysis tested the IVs identified from the literature review and determined their relationship to the DVs of embedment and embracement (Vannoy & Palvia, 2010). The strength of the relationship between the IVs and the DVs was useful in exploring the

innovation decision-making process at the IT executive management level. The literature review suggested that concerns and fears exist among senior IT executives about the attributes of network security, employee trust, ROI, operating costs, and productivity that are associated with ESC. IT executives also recognize the significant potential that ESC holds for innovation, collaboration, value creation, and employee enablement. The intent of the quantitative analysis was to confirm that the IVs were the factors that influenced the C-level executives' decision-making process regarding the adoption of ESC.

The survey consisted of a measurement item drawn from Moon et al. (2009) and Turner (2007). The social influence measurement items were developed from the social construct definitions of Vannoy and Palvia (2010). Moon et al. examined items for reliability using a composite scale reliability index. They found that all items met a criterion cut-off of 0.7. The composite scale reliability index is similar to using Cronbach's alpha for measuring an instrument's reliability. Turner developed and validated the survey by measuring reliability using Cronbach's alpha. A minimal threshold value of 0.70 was used for the Cronbach's alpha reliability test. Because many of the survey items from Turner were modified to reflect the perceptions, attitudes, and behaviors of C-level executives, a pilot test and a retest were conducted on this survey design to ensure that it exceeded a Cronbach's alpha threshold of .70 to achieve acceptable levels of validity and reliability.

Variables

The variables of interest in the current study were drawn from the literature and constituted the factors that influence executives' decision making when considering the

adoption of ESC. The IVs were social computing action, social computing consensus, social computing cooperation, social computing authority, perceived ease of use, perceived usefulness, perceived relative advantage, perceived compatibility, and organizational commitment support. The DVs were embedment and embracement.

Sample

The sample consisted of C-level executives only. The sample frame was made up of small, medium, and large companies that had IT functions (i.e., networking, operation system support, middleware integration, software development, collaboration applications, mobile infrastructure, etc.) within their respective organizations. A presurvey power calculation was performed to determine the minimum sample size required for the study. The power analysis was performed using G*Power, a statistical analysis tool developed by Faul, Erdfelder, Lang, and Buchner (2007). A *t* test was selected as the sample statistic. The statistical test performed was a means test, with a difference between two independent levels (alpha) of 0.05, an effective size (*d*) of 0.5, a power value (1- beta err prob.) of .95, and allocation ration N2/N1 of 1, which resulted in a minimum sample size calculation of 210. A post hoc power analysis was performed on the DVs of embracement and embedment, and a power of .99 was achieved, resulting in a sample of 125. The corresponding values of effect size f^2, error probability α, total sample size, number of tested predictors, and 1-β, for embedment and embracement, are shown in Tables 1 and 2, respectively.

Table 1 illustrates the results of the post hoc power analysis for the DV of embracement. The effect size for embracement was calculated at 8.43 based upon a

correlation coefficient for embedment of .89. Table 2 illustrates the results of the post hoc power analysis for the DV of embedment. The effect size was calculated at 7.47 based upon a correlation coefficient for embedment of .88.

Table 1

Post Hoc Power Analysis for Embracement (F Tests—Linear Multiple Regression: Fixed Model, R² Increase)

Parameter	Value
Analysis input	
Effect size f^2	8.43
α error probability	.05
Total sample size	125
No. of tested predictors	4
Total number of predictors	9
Analysis output	
Noncentrality parameter λ	1054.25
Critical *F*	2.45
Numerator *df*	4
Denominator *df*	115
Power (1-β err prob)	.99

Note. The effect size of 8.43 was calculated in G*Power based upon the correlation coefficient for embracement of .89. Post hoc: Compute achieved power.

Table 2

Post Hoc Power Analysis for Embedment (F Tests—Linear Multiple Regression: Fixed Model, R² Increase)

Parameter	Value
Analysis input	
Effect size f^2	7.47
α error probability	.05
Total sample size	125
No. of tested predictors	4
Total number of predictors	9
Analysis output	
Noncentrality parameter λ	934.32
Critical *F*	2.45
Numerator *df*	4
Denominator *df*	115
Power (1-β err prob)	.99

Note. The effect size of 7.47 was calculated in G*Power based upon the correlation coefficient for embedment of .88. Post hoc: Compute achieved power.

Sample Strategy

The sampling strategy entailed systematically selecting C-level executives from a randomized national database list (i.e., Specialdatabases.com). To ensure that the e-mail list was completely random, a Microsoft randomization function was applied against all e-mail addresses. Subsequently, a sample was drawn from the C-level executive list.

Sample Procedures

The participants, C-level CIOs and CTOs, were invited to complete the online survey website tool that allowed the researcher to enter the name and e-mail address of each potential participant manually. Subsequently, the service distributed an e-mail invitation to each potential participant. The service collected the survey data and provided the raw data output.

Procedures for Participation and Data Collection

The research data were designed to be collected via voluntary completion of a survey by randomly selected C-level executives across a variety of commercial IT organizations. An e-mail was sent to individual executives describing the purpose of the study and encouraging their participation. A web hyperlink was included in the e-mail for the respondents' convenience and to encourage survey participation. The survey was accessible to the executives via SurveyMonkey, an online survey capture service. Participants were provided with and required to electronically sign the informed consent via the online website prior to completing the survey. Demographic information about each respondent's job position, name of business unit or organization, market position of the business unit or organization, and size of the organization also was collected.

The survey was posted for 2 weeks, and the respondents were asked to submit their final responses via the online survey tool. Their responses were captured electronically and stored in the survey service database. A follow-up e-mail was sent to those respondents who expressed concern about the clarity of specific survey questions or the survey design. Access to the data was restricted to the researcher. The respondents exited the study by logging out of SurveyMonkey.

Instrumentations and Operationalization of Constructs

According to Trochim and Donnelly (2007), "The term operationalization is used to describe the act of translating a construct into its manifestation. In effect, you take your idea and describe is as a series of operations or procedures" (p. 21). Following is a description of the procedures used to translate the constructs.

The nine IVs were based upon several foundational theories. The following are brief descriptions of the constructs. The survey was designed to collect data for each construct in the research model. The questions that supported the operationalization of each construct are listed below the construct descriptions.

Reliability

A field test was conducted requesting feedback from five individuals regarding the clarity, readability, and deliverability of the survey items. They were asked to read the items and provide comments if the survey items were not clear or if they had recommendations to improve particular items or any part of the survey design. Three of the five individuals provided comments. The following verbatim comments were received from the participants:

1. "Appears very comprehensive. No comments on the questions. Just wondering if you should add any room at the end of the survey for any text commentary and/or space for any clarification on any answers C-level executives would like to provide."
2. "Excellent survey and questions."
3. "Your topic for dissertation/thesis is very interesting and very relevant to our area now."

Pilot Study

A pilot test and a retest were conducted on the survey design to ensure that it exceeded a Cronbach's alpha threshold of 0.70 to achieve an acceptable level of validity and reliability. Upon completion of the validity and reliability testing, a statistical analysis was performed to examine the degree to which the hypothesized relationships were supported by the collected survey data and to ensure that the survey was sufficient to answer the research questions (Turner, 2007).

Social Computing Action

The construct of social computing action was derived from Chapin's (1936) seminal work on social theory and social action. Chapin suggested that social actions are promoted by "two different, but over-lapping" means: First, social actions are planned and directed toward clear goals, and second, social actions are sometimes due to the "unintended consequences that follow from the interrelationship among personal forces" (p. 1). The first approach often is attributed to decisive actions demonstrated by people in leadership positions, including business executives, lawyers, and politicians. The second

approach does not come about by carefully planned and intended actions; rather, it evolves as a consequence of group activities. For example, text messaging evolved into a ubiquitous social activity when individuals became aware of and convinced that they should engage with others in this type of activity (Vannoy & Palvia, 2010). Originally, text messaging was a technology designed as a subscriber service to inform end users of information updates. It quickly became adopted as an alternative to e-mail and voicemail messaging because of its ease of use, accessibility, and speed.

I found no previous measurement instruments for social computing action in the context of the enterprise. The survey items used in this study to measure social computing action were derived from the research by Vannoy and Palvia (2010) and appear in Table 3. Survey Items 1 to 3 focused on the construct of social computing action.

Table 3

Social Computing Action, Survey Items, and Likert Response Options

Survey section	Survey items	Likert responses				
Social computing action		1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly agree
	1. My organization's social computing actions are planned and directed toward clear goals.					
	2. I believe social computing actions could be used toward social and group activities (e.g., point-to-point file sharing, instant messaging, text messaging).					
	3. My organization has a clearly stated and coherent shared vision of the future.					

Social Computing Consensus

The construct of social computing consensus was derived from Horowitz's (1962) social consensus theory. According to Vannoy and Palvia (2010), consensus theory "states that an action is right if there is agreement from all people who are involved in a particular situation that it is right…in other words, there is a consensus of shared values and expectations" (p. 152). The theory supports the notion that people in a group are able to reach consensus by acknowledging differences of opinion and then working reasonably toward resolution. Survey Items 4 to 10 focused on the construct of social computing consensus (see Table 4).

Table 4

Social Computing Consensus, Survey Items, and Likert Response Options

Survey section	Survey items	Likert responses				
Social computing consensus		1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly agree
	4. My organization's use of social computing allows employees to be able to arrive at a reasonable way to resolve differences of opinion. 5. I believe that the adoption of ESC presents risk to protected trade secrets. 6. I believe that the adoption of ESC presents risks to patents. 7. I believe that the adoption of ESC presents risks to copyrights. 8. I believe that network security is an important factor towards my decision to adopt. ESC 9. I am concerned that adoption of ESC presents corporate security risks. 10. I believe the needs of a group are more important than the needs of the individual.					

Social Computing Cooperation

The construct of social computing cooperation was derived from Axelrod's (2000) cooperation theory. According to Axelrod, cooperation theory "addresses what is good for the individual actor in the short term and what is good for the group in the long run" (p. 3). Ultimately, the theory attempts to address whether cooperation is in the best interests of all parties in a social situation. Survey Items 11 to 16 focused on the construct of social computing cooperation (see Table 5).

Table 5

Social Computing Cooperation, Survey Items, and Likert Response Options

Survey section	Survey items	Likert responses				
Social computing cooperation		1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly agree
	11. It is important to be a member of an online group or community of common or community of common interest. 12. Time should be allowed for exploratory learning and skills development, using social computing tools. 13. I believe people are honest and open when working in teams with social computing tools. 14. I am concerned about the governance structures of on-line communities. 15. ESC allows errors and problems to be shared openly and recognized as opportunities for organizational learning. 16. I believe my organization allows external partners and customers to communicate and share with our organization via social computing tools.					

Social Computing Authority

The construct of social computing authority was derived from Zambrano's (2000) social theory of authority. Vannoy and Palvia (2010) explained that a modern perspective of social theory of authority supports the idea that a relationship of authority is formed when an individual or a group takes action based upon a request from either another individual or group.

According to Zambrano (2000),

> The social theory of authority is a collection of principles aimed at an understanding: (a) how the circumstances of living in a community affect the authority relations that exist among its members, and (b) how the evolution of the community itself is affected by the web of authority relations. (p. 2)

Survey Items 17 and 18 focused on the construct of social computing authority (see Table 6).

Table 6

Social Computing Authority, Survey Items, and Likert Response Options

Survey section	Survey items	Likert responses				
Social computing authority		1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly agree
	17. I believe that a relationship of authority exists when individuals perform some action that is dictated by others. 18. I believe in group-authority.					

Perceived Ease of Use

The construct of perceived ease of use was derived from Davis's (1989) work on perceived ease of use and user acceptance of IT. According to Davis, "Perceived ease of use refers to the degree to which a person believes that using a particular system would be free of effort" (p. 320). Davis also posited, "An application perceived to be easier to use that another is more likely to be accepted by users" (p. 320). The construct of perceived of ease of use is an important component of the TAM (Davis et al., 1989) and is related specifically to the behavioral characteristic of acceptance. The researcher used instruments previously used by Moon et al. (2009) to measure the construct of perceived ease of use. Survey Items 19 to 22 focused on this construct (see Table 7).

Table 7

Perceived Ease of Use, Survey Items, and Likert Response Options

Survey section	Survey items	Likert responses				
Perceived ease of use		1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly agree
	19. Learning to apply ESC software is easy for me. 20. I find it easy to get ESC software to do what I want to do. 21. It would be easy for me to become skillful at using ESC software. 22. I would find ESC software easy to use.					

Perceived Usefulness

The construct of perceived usefulness was derived from the TAM (Davis et al., 1989). Like the construct of perceived ease of use, perceived usefulness is a construct

variable in the TAM. The perceived usefulness measurement item was taken from a prior study by Moon et al. (2009). Survey Item 23 focused on this construct (see Table 8).

Table 8

Perceived Usefulness, Survey Items, and Likert Response Options

Survey section	Survey items	Likert responses				
Perceived usefulness		1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly agree
	23. I would find ESC useful in my job.					

Perceived Relative Advantage

The construct of relative advantage construct was derived from Rogers's (2003) diffusion of innovations theory. Rogers posited that the relative advantage of an innovation is a strong predictor of its rate of adoption. According to Rogers, "The relative advantage is the degree to which an innovation is perceived as being better than the idea it supersedes" (p. 229). In economic terms, the relative advantage of an innovation is measured by its profitability or the level of socioeconomic prestige that is conveys. Survey Items 24 to 29 focused on the construct of perceived relative advantage (see Table 9).

Table 9

Perceived Relative Advantage, Survey Items, and Likert Response Options

Survey section	Survey items	Likert responses				
Perceived relative advantage		1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly agree
	24. I believe it benefits me to engage in on-line communities. 25. I believe it benefits me to build on-line relationships. 26. I believe ESC tools are productive tools. 27. Using ESC improves the quality of my work. 28. Using ESC makes it easier to do my job. 29. Using ESC enhances my effectiveness on the job.					

Perceived Compatibility

The construct of perceived compatibility was derived from Rogers's (2003) diffusion of innovations theory. Rogers defined compatibility as "the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters" (p. 240). Rogers found that "an innovation's incompatibility with cultural values can block its adoption" and that "compatibility of an innovation with a preceding idea can either speed up or retard its rate of adoption" (p. 243). Survey Items 30 and 31 focused on the construct of perceived compatibility (see Table 10).

Table 10

Perceived Compatibility, Survey Items, and Likert Response Options

Survey section	Survey items	Likert responses				
Perceived compatibility		1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4. Agree	5. Strongly agree
	30. I think that using ESC fits well with the way I like to work. 31. Using ESC fits into my work style.					

Organizational Commitment

Survey Items 32 to 34 focused on the construct of perceived organizational commitment (see Table 11).

Table 11

Organizational Commitment, Survey Items, and Likert Response Options

Survey section	Survey items	Likert responses				
Social computing action		1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly agree
	32. My organization is committed to supporting my effort to use ESC. 33. My organization strongly encourages the use of ESC. 34. I have the resources necessary to use ESC.					

Dependent Variables

Embedment, as defined by Vannoy and Palvia (2010),

> [Is] measured by evaluating the degree to which others in the environment utilize the technology in the same way, at the same time or greater level, the degree to

which the message provided by the technology is understood by the recipient, and the degree to which the user views the technology as a necessity. (p. 153)

Survey Items 35 to 40 focused on the DV of embedment (see Table 12).

Table 12

Embedment, Survey Items, and Likert Response Options

Survey section	Survey items	Likert responses				
Embedment		1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly agree
	35. The use of social computing tools is important towards achieving my organization's vision and goals. 36. I believe multiple viewpoints are encouraged and cultivated with social computing tools. 37. I believe open productive debates are encouraged and cultivated with social computing tools. 38. Using ESC enables me to accomplish task more quickly. 39. Using ESC give me greater control over my work. 40. The use of ESC is important to my organization.					

Embracement, as defined by Vannoy and Palvia (2010), "is measured by evaluating the value of the technology to the individual, the empowerment experienced by the individual and the degree of anticipation by which the technology is viewed" (p. 153). Survey Items 41 to 44 focused on the DV of embracement (see Table 13).

Table 13

Embracement, Survey Items, and Likert Response Options

Survey section	Survey items	Likert responses				
Embracement		1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly agree
	41. Using ESC would increase my productivity in my job. 42. Using ESC would improve my performance in my job. 43. Using ESC would enhance my effectiveness in my job. 44. My organization will recognize my efforts in using ESC.					

Table 14 identifies the three constructs of the ESIM of technology adoption and the associated IVs. The table also shows the relationship between the IVs and the contributing theorists or researchers.

Table 14

Predictor Categories and Associated Theoretical Constructs

Predictor category	IV	Theoretical reference
Social influence	Social computing action	Chapin (1936)
	Social computing consensus	Horowitz (1962)
	Social computing cooperation	Axelrod (1962)
	Social computing authority	Zambrano (2000)
Organizational innovation characteristics		
	Perceived relative advantage	Rogers (1989)
	Perceived compatibility	Rogers (2003)
	Organizational commitment	Turner (2007)
Technology acceptance	Perceived ease of use	Davis (1989)
	Perceived usefulness	Davis (1989)

Note. Adapted from "The Social Influence Model of Technology Adoption," by S. A. Vannoy and P. Palvia, 2010, *Communication of the ACM, 53,* p. 152. Copyright 2010 by Association for Computing Machinery.

Data Analysis Plan

SurveyMonkey was used to track the pretest and posttest data, returned surveys, and missing respondent values. Once the data were received, they were screened for accuracy and quality. SPSS v.22 was used to run the descriptive analysis of the data, transform the data, and generate output reports.

A stepwise multiple linear regression analysis was performed, given that there were multiple IVs and hypotheses stating that there was a positive relationship between each of the IVs and DVs. The results were interpreted by either rejecting or accepting the null hypotheses. If a null hypothesis was rejected, or if the assumptions of parametric statistics were found to be invalid, then a chi-square analysis was performed on the invalid data after separating the data into groups, or bins.

Assumptions

The methodology of the study required several assumptions:

- Each surveyed organizational unit was essentially homogeneous in regard to the predictors measured.
- Participation in the study was voluntary, and the survey input reflected the participants' truthful and objective perceptions as well as unbiased opinion.
- Each surveyed organizational unit had a functional understanding of ESC.

Threats to Validity

The survey constructs were derived primarily from the diffusion of innovations theory, the TAM, and social influence theory. All constructs had been researched

extensively and published in peer-reviewed academic journals articles, research manuals, and books. The construct validity of the survey was measured using a pilot test and a retest to ensure that it exceeded a Cronbach's alpha threshold of 0.70. In the following sections, threats to external, internal, construct, and conclusion validity are explained.

Threats to External Validity

The study focused on one IT innovation: ESC. Researchers have cautioned making generalizations based upon the results of a single innovation, so formalizing generalizations from the results might require findings across similar innovations with other people at different times and in dissimilar places. To address any threat to external validity, I focused on drawing the sample from the target population. A randomized selection procedure ensured a random sampling and generalization of the outcome.

Threats to Internal Validity

The research was designed to be a single-group study of C-level executives. Therefore, history, testing, and mortality threats were addressed to mitigate the impact of any threat on internal validity. The history threat was addressed by requiring the participants to complete the survey within a 2-week period. The short duration of participation mitigated the potential for historical events to threaten the research outcomes. The testing threat (i.e., pilot test) was addressed by ensuring that the individuals who participated in the pilot test were not included in the final participant list. The mortality threat was addressed by closely monitoring the dropout rate via SurveyMonkey's monitoring tool. If any participants dropped out, additional participants were added to the list by using the random sampling method described previously.

Threats to Construct Validity

The threat to construct validity was addressed by conducting an in-depth review of the survey with a panel of experts to reduce the likelihood of making either a Type I or a Type II error and help mitigate the potential of low reliability of the research measures. Online administration of the survey also helped to reduce the chances of poor reliability of the program implementation. Random irrelevancies in the survey setting and random heterogeneity of the respondents were not expected to be considerable factors for the target population of CIOs and CTOs.

Threat to Conclusion Validity

The treat to conclusion validity was addressed in three ways to ensure that the results were reasonable. First, the survey was designed to have a statistical power greater than 0.8 in value. Second, the survey was designed to have good reliability. Third, the survey was administered consistently and according to standard protocols. To ensure strong statistical power of the survey results, the researcher used a sample of 125 participants. Good reliability was assured by designing the pilot test and posttest questions on the same scale and designing the posttest survey with a reasonably high total of 44 scaled items. The survey was administered consistently through SurveyMonkey to ensure adherence to the survey design.

Ethical Procedures

All prospective participants were informed of the procedures to complete the survey, along with the risks and benefits of joining the study, and they were required to give their consent before completing the survey voluntarily. No form of coercion

occurred during the pilot test or the data collection phase. The anonymity of the participants was maintained. Walden University's Institutional Review Board conducted a review of the proposal and gave the researcher permission to proceed with the study. No confidential information was collected in the survey. I handled and processed all materials related to the pilot test and the survey to eliminate any ethical concerns.

Limitations

The study was limited to an exploratory analysis of the relationship between social influence, organizational innovation characteristics, technology acceptance, as well as the role of ESC as an innovation. The study was limited to IT and focused only on the adoption of ESC. Other IT innovations not under the category of ESC were not considered. The study was performed using a quantitative approach, so there were limitations to the complexity of survey items that could be asked, the order in which the items could be administered, and the spontaneity of responses because of the structure of the survey. There also were observational limitations resulting from the nature of the quantitative survey, meaning that quantitative surveys do not permit observations and the capture of nonverbal behavior (see Table 15).

Table 15

Predictor Categories, Construct, and Associated Survey Measurement

Predictor category	Construct	Survey measurement
Social influence		
	Social computing action	Items 1-3
	Social computing consensus	Items 4-10
	Social computing cooperation	Items 11-16
	Social computing authority	Items 17-18
Technology acceptance		
	Perceived ease of use	Items 19-22
	Perceived usefulness	Item 23
Organizational innovation characteristics		
	Perceived relative advantage	Items 24-29
	Perceived compatibility	Items 30-31
	Organizational commitment	Items 32-34
	Embedment	Items 35-40
	Embracement	Items 41-44

Note. Relationship of the research model construct and survey question to the predictor category.

Summary

In Chapter 3, an integrated model of three constructs was identified along with the corresponding factors (e.g., predictors) that previous research has suggested is responsible for influencing C-level executives' adoption of IT innovations. The model was constructed to consider the social influences and organizational innovation factors involved in executive decision making in a commercial IT organization. In particular, the researcher examined these factors in the context of ESC. The survey, which was based upon the diffusion of innovation theory, the TAM, and social influence theory, was introduced. The IVs were operationalized, and details about the administration of the survey and the collection of the data were presented.

In Chapter 4, the IVs are analyzed for their relative predictive strength in influencing adoption. Each IV is compared to empirical findings and assessed for its

relative contribution. In addition, the results of the pilot study are reported, the data collection process is described, data discrepancies are identified, and the quantitative statistical results are presented.

Chapter 4: Results

Introduction

The purpose of this chapter is to report the results of this quantitative study in both narrative and illustrative form. The chapter begins with an overview of the pilot study and moves on to describe the data collection protocol, the data analysis process, and the statistical results. The objective of the statistical analysis was to quantify the perceptions of C-level executives toward social influence, organizational innovation characteristics, and the adoption of ESC. Three research questions were analyzed:

1. What are C-level executives' perceptions of social influence?

2. What are C-level executives' perceptions of organizational innovation characteristics?

3. What are C-level executives' perceptions of the adoption of ESC?

The presentation of the survey results is divided into four sections. The Pilot Study section includes explanations of the survey objective, the pilot results, and the impact of the results on the main study. The Data Collection section addresses the data collection time frame and the descriptive and demographic characteristics of the sample. In the Results section, I report the descriptive statistics that characterized the sample, evaluate the statistical assumptions, report the statistical analysis findings, and include tables and figures to illustrate the results. The Summary section provides answers to the research questions and offers my interpretation of the findings in Chapter 5.

Pilot Study

The major objectives of the pilot study were to (a) ensure that each survey item achieved or exceeded a Cronbach's alpha threshold value of .70, and (b) determine whether amendments to the survey items were necessary. The survey was administered to 250 randomly selected CIOs and CTOs. Randomization was achieved by running a Microsoft Excel random-order generator on an e-mail list of 29,475 CIOs and CTOs and selecting the first 250 random e-mails from the list. From the sample, nine of 10 completed surveys were obtained. Cronbach's alpha was calculated for each item in the survey. The SPSS report indicated that each survey item exceeded a Cronbach's alpha of .70. Table 16 summarizes the calculated values of Cronbach's alpha for each survey item. The raw data values can be found in Appendix C.

Table 16

Reliability Analysis for Pilot Survey

Predictor category	Construct	Survey item	Cronbach's alpha
Social influence	Social computing action	1	.94
		2	.94
		3	.95
	Social computing consensus	5	.94
		6	.95
		7	.95
		9	.95
		10	.95
		11	.94
	Social computing cooperation	12	.94
		13	.94
		14	.94
		15	.95
		16	.94
		17	.95
Social influence	Social computing authority	18	.95
		19	.94
Technology adoption	Perceived ease of use	22	95
		23	.95
		24	.95
		25	.95
	Perceived usefulness	29	.94
Organizational innovation characteristics	Perceived relative advantage	30	.94
		31	.94
		32	.94
		34	.94
		35	.94
		36	.94
	Perceived compatibility	38	94
		39	.94
	Organizational commitment	40	.94
		41	.94
		44	.94
	Embedment	4	.94
		20	.94
		21	.94
		33	.94
		37	.94
		43	.94
	Embracement	26	.94
		27	.94
		28	.94
		42	.94

Note. Values for alpha were rounded to two decimal digits.

Forty-four survey items were analyzed in the pilot study, and each item corresponded to one of the independent variables (IVs) or the dependent variables (DVs) under study. The statistical analysis of the pilot data confirmed that each variable exceeded a Cronbach's alpha threshold of .70, thus ensuring acceptable levels of validity and reliability. No changes were made to the instrumentation in the form of modified or additional questions. Some questions were recategorized under different constructs to align more appropriately with the definitions of particular variables. In addition, further information was provided in the cover letter to clarify the purpose of the study to the participants and provide them with further instructions to complete the survey. The data collection and data analysis protocols remained the same. SurveyMonkey was used to invite the respondents to complete the survey, provide instructions on the survey procedure, and collect the data.

Data Collection

Invitations to participate in the study were sent via SurveyMonkey's e-mail application to 29,475 randomly selected C-level executives. The executives were instructed to submit the completed survey within 2 weeks of receiving the invitation. Attached to the e-mail was a cover letter stating the reason for the study; the time frame to collect the data; my contact information; and the definition of social computing, as expressed by Vannoy and Palvia (2010). Table 17 highlights the survey response results based upon information specific to the invitation date; the number of invitations sent; the number of responses; the number of nonresponses; the number of opted-out invitees; and the number bounced (i.e., invalid e-mail addresses).

Table 17

Survey Response Results

Date	No. sent	Nonresponses	Responses	Opted out	Bounced
1/14/15	478	473	5	4	4
1/18/15	2,230	2,207	23	8	7
2/11/15	8,928	8,850	78	30	22
2/17/15	8,949	8,859	90	18	66
2/24/15	8,890	8,821	69	17	58
Total	29,475	29,210	265	77	157

Note. All survey data values were obtained from SurveyMonkey.com online services.

The response rate of 0.89% was based upon receipt of 265 responses to 29,475 e-mailed invitations. The response rate was lower than the 1% to 3% estimated from the pilot study. To achieve the sample target of 265, the first two survey collection periods were extended by 1 week, and additional survey invitations were sent. The lower than estimated response rate by the C-level executives might have been attributable to their busy work schedules or their wariness about receiving an e-mail invitation directly from an online survey site.

The data collection plan was adhered to closely. Multiple groups of invitations were sent to acquire an adequate sample size. The survey was posted on SurveyMonkey for 2 weeks, and the majority of responses were submitted within the first few days of the posting. Two additional reminder notices were sent to each group of invitees (i.e., CIOs and CTOs) during the 2-week posting period. All participants submitted their final responses via SurveyMonkey. The responses were collected from the SurveyMonkey website and stored in a secured and removable thumb drive. Participants who provided write-in comments were contacted immediately via e-mail. Further information and clarification were provided to address all participant questions.

A total of 259 responses were collected. A subtotal of 125 respondents from that total identified their job position as CIO or CTO. Therefore, the final sample comprised 125 participants. The remaining 140 respondents identified their organizational position as owner, president, or senior IT executive; therefore, they were excluded from the sample.

Baseline Descriptive Statistics

Table 18 shows the means and standard deviations for the DVs and IVs. All of the mean scores were between 3.0 and 3.6, indicating average scores within the same range. Standard deviations ranged from .46 to .97, indicating that variances for the variables were not equal.

Table 18

Multiple Regression Analysis for the DVs of Embedment and Embracement and the Nine IVs

Variables	*M*	*SD*
Embedment (DV)	3.28	.71
Embracement (DV)	3.13	.84
Perceived usefulness (IV)	3.02	.81
Perceived ease of use (IV)	3.52	.49
Social computing action (IV)	3.45	.70
Social computing consensus (IV)	3.34	.52
Social computing cooperation (IV)	3.48	.46
Social computing authority (IV)	3.36	.62
Perceived relative advantage (IV)	3.35	.79
Perceived compatibility (IV)	3.13	.97
Organizational commitment (IV)	3.09	.86

Demographics

A sample of 35,000 organizations was purchased from Specialdatabases.com, an online service that provides e-mail listings of CIOs and CTOs in U.S. corporations. From the sample frame of 35,000 e-mail listings, a total of 29,475 were used in the survey. The

remaining 5,525 were tagged and removed by SurveyMonkey. Some of the invitees asked to have their e-mail address removed from the SurveyMonkey database to prevent invitations to future online surveys.

From the total number of 29,475 invitees, 265 responded, and 125 (47%) of these responses were used (i.e., the surveys were properly completed by respondents who also identified their organizational title as CIO or CTO). All other responses were excluded from the sample frame and analysis. A response rate of .89% was achieved, meaning that 265 responses were received from 24,475 invitations.

The sample comprised 125 male and female CIOs and CTOs from small, medium, and large companies and organizations. A prestudy and a post hoc power analysis were performed to calculate the minimum sample size needed. The prestudy power analysis calculated a minimum sample of 210 participants. A post hoc power analysis using a sample of 125 was performed and achieved a power of .99 for the DVs of embedment and embracement. The rationale for choosing small, medium, and large organizations was that (a) no prior research had targeted the perceptions of CIOs and CTOs from organizations of these sizes in an ESC context, and (b) the e-mail listings for the CIOs and CTOs of small, medium, and large companies were readily available. According to the American Business Information Corporation (as cited in Marchi, 1999), small organizations have fewer than 20 employees, medium-sized organizations have between 20 and 499 employees, and large organizations have 500 or more employees.

There was no clear pattern of organizational frequency. The majority of organizations were large and had 501 to more than 100,000 employees. Of the total, 4%

were small, 47.2% were medium, and 48.8% were large organizations. Other demographic data—namely, age, gender, race, or income levels—were not collected in this survey. Table 19 shows the relationship between the number of employees and the frequency found in the organizations sampled, the percent frequency, and the cumulative percentages.

Table 19

Frequency of Organization Size

No. of employees	Frequency of organization	% frequency	Cumulative %
0-10	5	4	4
11-100	24	19.2	23.2
101-500	35	28	51.2
501-1,000	13	10.4	61.6
1,001-5,000	27	21.6	83.2
5,001-10,000	4	3.2	86.4
10,001-50,000	10	8	94.4
50,000-100,000	1	.8	95.2
100,000+	6	4.8	100
Total	125		

Construct Descriptive Statistics

The constructs were measured on a 5-point Likert scale that ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). All constructs, except for perceived usefulness, included multiple survey items. Thus, social computing action had three survey items, social computing consensus had seven survey items, social computing cooperation had six survey items, and so forth.

Research Results

Statistical Analysis of the Findings

The objective of the study and the subsequent analysis of the data was to better understand the factors that influenced the C-level executives' perceptions about the

adoption of ESC. The research questions and hypotheses were constructed to address three categories of predictors postulated to influence IT adoption in a social computing context: social influence (social computing action, social computing consensus, social computing authority, social computing cooperation); organizational innovation characteristics (perceived relative advantage, organizational commitment, and perceived compatibility); and technology acceptance (perceived ease of use and perceived usefulness). A stepwise multiple linear regression technique was used to build the mathematical equations for the DVs of embracement and embedment. Each hypothesis was tested to determine whether a significant relationship existed between each IV and the DVs of embedment and embracement.

Research Questions and Hypotheses

Three research questions and their hypotheses guided this study. Hypotheses 4 and 5 are reserved for future inquiries.

Research Question 1: What are C-level executives' perceptions of social influence? The social influence construct related to four IVs: social computing consensus, social computing cooperation, social computing authority, and social computing action. In Hypothesis 1, each IV was tested against the DVs of embedment and embracement, respectively.

Alternative Hypothesis 1: The ESIM of technology adoption will result in the following significant relationships:

- H_{a1a}: There is a significant relationship between social computing consensus and embracement.

- H_{a1b}: There is a significant relationship between social computing consensus and embedment.
- H_{a1c}: There is a significant relationship between social computing cooperation and embracement.
- H_{a1d}: There is a significant relationship between social computing cooperation and embedment.
- H_{a1e}: There is a significant relationship between social computing authority and embracement.
- H_{a1f}: There is a significant relationship between social computing authority and embedment.
- H_{a1g}: There is a significant relationship between social computing action and embracement.
- H_{a1h}: There is a significant relationship between social computing action and embedment.

Null Hypothesis 1

- H_{01a}: There is no relationship between social computing consensus and embracement.
- H_{01b}: There is no relationship between social computing consensus and embedment.
- H_{01c}: There is no relationship between social computing cooperation and embracement.

- H_{01d}: There is no relationship between social computing cooperation and embedment.
- H_{01e}: There is no relationship between social computing authority and embracement.
- H_{01f}: There is no relationship between social computing authority and embedment.
- H_{01g}: There is no relationship between social computing action and embracement.
- H_{01h}: There is no relationship between social computing action and embedment.

Research Question 2: What are C-level executives' perceptions of organizational innovation characteristics? The organizational innovation characteristic construct examined three IVs: organizational commitment, perceived relative advantage, and perceived compatibility. In Hypothesis 2, each IV was tested against the DVs of embedment and embracement, respectively.

Alternative Hypothesis 2: The ESIM of technology adoption will result in the following significant relationships:

- H_{a2a}: There is a significant relationship between organizational commitment and embracement.
- H_{a2b}: There is a significant relationship between organizational commitment and embedment.

- H_{a2c}: There is a significant relationship between perceived relative advantage and embracement.
- H_{a2d}: There is a significant relationship between perceived relative advantage and embedment.
- H_{a2e}: There is a significant relationship between perceived compatibility and embracement.
- H_{a2f}: There is a significant relationship between perceived compatibility and embedment

Null Hypothesis 2

- H_{02a}: There is a no relationship between organizational commitment and embracement.
- H_{02b}: There is no relationship between organizational commitment and embedment.
- H_{02c}: There is no relationship between perceived relative advantage and embracement.
- H_{02d}: There is no relationship between perceived relative advantage and embedment.
- H_{02e}: There is no relationship between perceived compatibility and embracement.
- H_{02f}: There is no relationship between perceived compatibility and embedment.

Research Question 3: What are C-level executives' perceptions of the acceptance of ESC? The social influence construct examined two IVs: perceived ease of use and perceived usefulness. In Hypothesis 3, each of the IVs was tested against the DVs of embedment and embracement, respectively.

Alternative Hypothesis 3: The ESIM of technology adoption will result in the following significant relationships:

- H_{a3a}: There is a significant relationship between perceived ease of use and embracement.
- H_{a3b}: There is a significant relationship between perceived ease of use and embedment.
- H_{a3c}: There is a significant relationship between perceived usefulness and embracement.
- H_{a3d}: There is a significant relationship between perceived usefulness and embedment.

Null Hypothesis 3

- H_{03a}: There is no relationship between perceived ease of use and embracement.
- H_{03b}: There is no relationship between perceived ease of use and embedment.
- H_{03c}: There is no relationship between perceived usefulness and embracement.

- H_{03d}: There is no relationship between perceived usefulness and embedment.

Hypothesis 4: There is a statistically significant relationship between organizations that use ESC and the rate of innovation, as measured by the number of patents.

Hypothesis 5: Organizations that adopt social computing will create more disruptive innovations than organization that do not adopt social computing.

Multiple Linear Regression Analysis

SPSS v.22 was used to perform the multiple linear regression analysis and investigate the hypotheses. A stepwise method was used to validate the minimal number of IVs (predictors); their statistical significance; and their predictive value (i.e., strength) in explaining the variance in the DVs of embracement and embedment. It was hypothesized that all nine IVs (i.e., social computing action, social computing authority, social computing consensus, social computing cooperation, perceived ease of use, perceived usefulness, organizational commitment, perceive compatibility, and perceived relative advantage) within the three constructs or categories (i.e., social influence, organizational innovation characteristics, and technology acceptance) could be integrated into a multivariate model that could predict and explain the variance in the DVs of embedment and embracement.

The stepwise multiple linear regression technique was automated using SPSS v.22. A stepwise technique finds the best-fit linear regression for multivariate research

models (i.e., equations). For the purpose of this study, the terms *model* and *equation* were used interchangeably. The stepwise function was repeated four times for each DV and yielded two mathematical equations, one for embracement and one for embedment. The technique systematically adds or removes IVs to derive the best-fit multivariate linear regression equation (Walonick, 2007). The IVs were added based upon assigned significance levels that determined whether they were significantly related to the DVs. For this study, the assigned significance level was $\alpha = .05$. The IVs that were found to be insignificant were excluded from the final equation. Appendix D provides a summary of the stepwise multiple linear regressions, listing the order in which the predictors were added to the equation and their associated statistical values. Table 20 illustrates the results of the stepwise multiple linear regression analysis for the DV of embracement.

Table 20

Stepwise Multiple Linear Regression Analysis Results Between DV of Embracement and IVs

Model	*SS*	*df*	*MS*	*F*	Sig.
Regression	70.33	4	17.58	118.87	.00
Residual	17.75	120	.15		
Total	88.10	124			

Note. $N = 125$.

The stepwise multiple linear regression analysis found that the overall embracement model was significant ($p < .001$) and that each beta coefficient (i.e., perceived relative advantage, organizational commitment, social computing action, and perceived ease of use) was significant. Perceived relative advantage, organizational commitment, and social computing action were found to be significant and positively related to the DV of embracement; perceived ease of use was significant and negatively

related to it. This negative relationship is discussed in Chapter 5. Table 21 illustrates the unstandardized beta coefficients (β) and associated *p* values.

Table 21

Beta Coefficients for the Embracement Equation

Predictor	Unstandardized coefficients (β)	Sig. (*p*)
Perceived relative advantage	.868	.000
Organizational commitment	.146	.000
Social computing action	.148	.022
Perceived ease of use	-.181	.000

A stepwise multiple linear regression analysis for the DV of embedment found that the overall equation was significant ($p < .001$) and that each beta coefficient (i.e., perceived relative advantage, organizational commitment, social computing action, and social computing consensus) was significant. Perceived relative advantage provided the strongest predictive value to explain the variance in embedment. Included in Appendix E is a summary of the stepwise multiple linear regressions listing the order in which the predictors were added to the embedment equation and their associated statistical values. Table 22 illustrates the results of the stepwise multiple linear regression analysis for the DV of embedment. Table 23 shows the unstandardized beta coefficients and associated *p* values for embedment.

Table 22

Stepwise Multiple Linear Regression Analysis Results Between the DV of Embedment and the IVs

Model	*SS*	*df*	*MS*	*F*	Sig.
Regression	48.43	4	12.11	105.11	.00
Residual	13.82	120	.115		
Total	62.26	124			

Table 23

Beta Coefficients for Embedment Equation

Predictor	Unstandardized coefficients (β)	Sig. (*p*)
Perceived relative advantage	.546	.000
Organizational commitment	.234	.000
Social computing action	.183	.000
Social computing consensus	.141	.000

Research Assumptions

The multiple linear regression analysis allowed me to make four key assumptions: linear relationship, multivariate normality, little or no multicollinearity, and homoscedasticity (Statistics Solutions, 2009). Scatterplots were developed to test for linearity and homscedasticity (i.e., the error term along the regression line remains equal), and histograms were developed to check for multivariate normality.

Linear Relationship

I conducted a test of linearity for all research model constructs using scatterplots for the DVs of embracement (see Figure 8) and embedment (see Figure 9). The regression standardized predicted values were plotted against the regression standardized residual. The error terms associated with embracement found approximately equal amounts of error along the regression line, indicating a linear relationship.

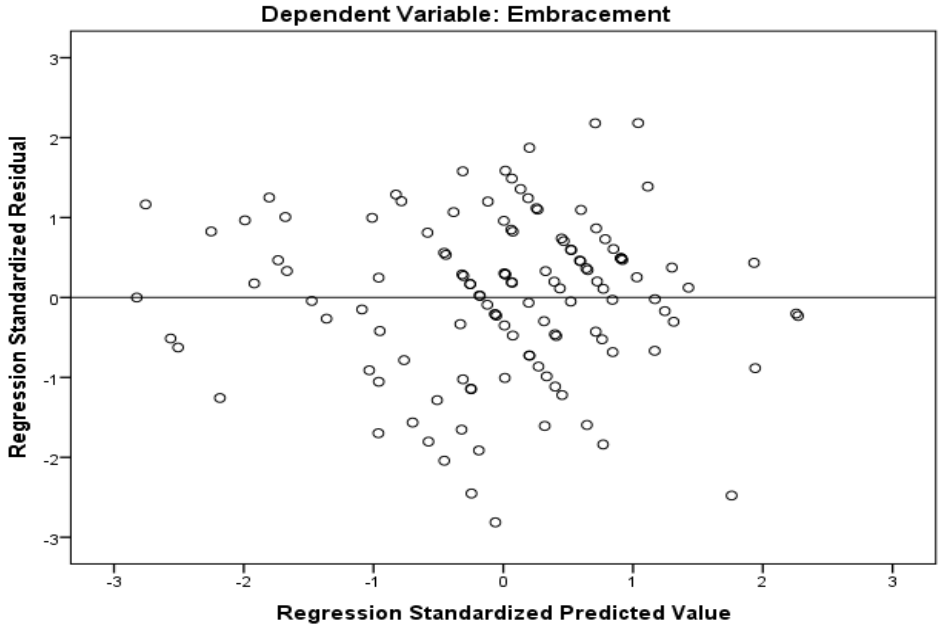

Figure 8. Scatterplot of regression standardized residual versus regression standardized predicted value for embracement.

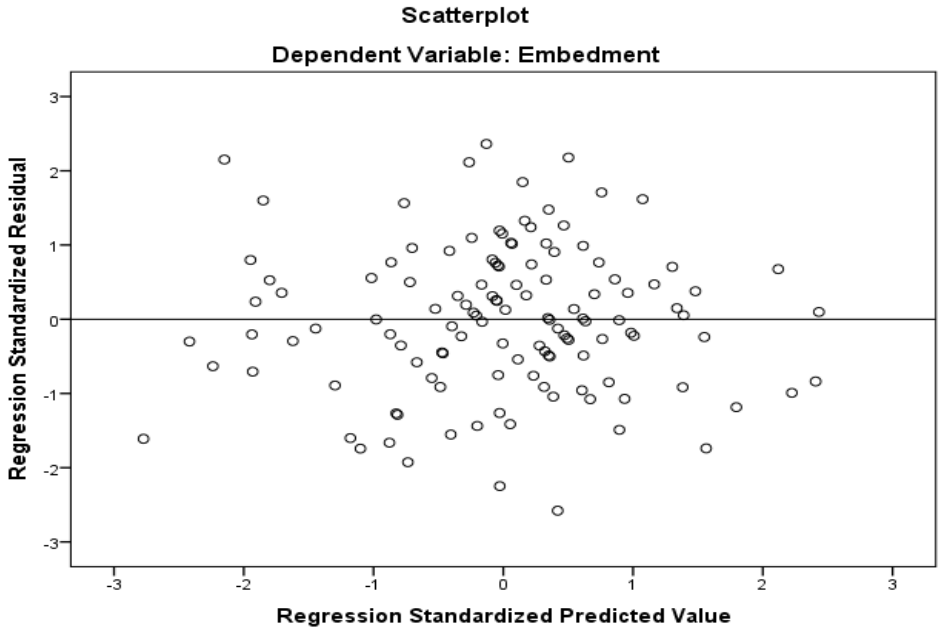

Figure 9. Scatterplot of regression standardized residual versus regression standardized predicted value for embedment.

Multivariate Normality

Figure 10 illustrates a normal P-P plot of regression standardized residual for embracement. Slight violation of normality was tolerated because of the large sample of 125 participants.

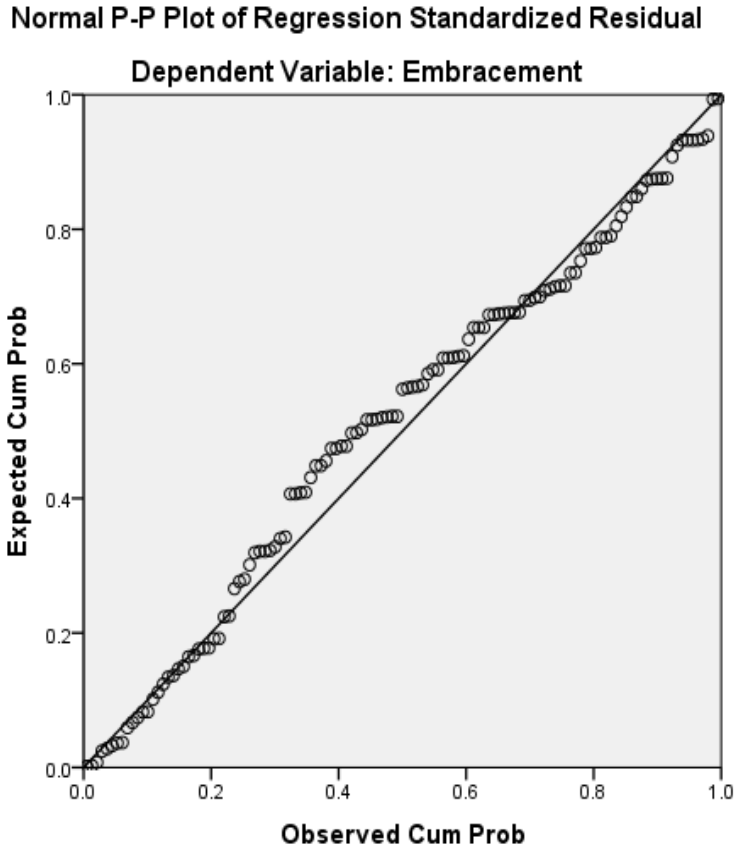

Figure 10. Normal P-P plot of expected cumulative probability versus observed cumulative probability for the DV of embracement.

Figure 11 illustrates a normal P-P plot of regression standardized residual for embedment. The data points for embedment were more tightly couple around the regression line than they were for embracement.

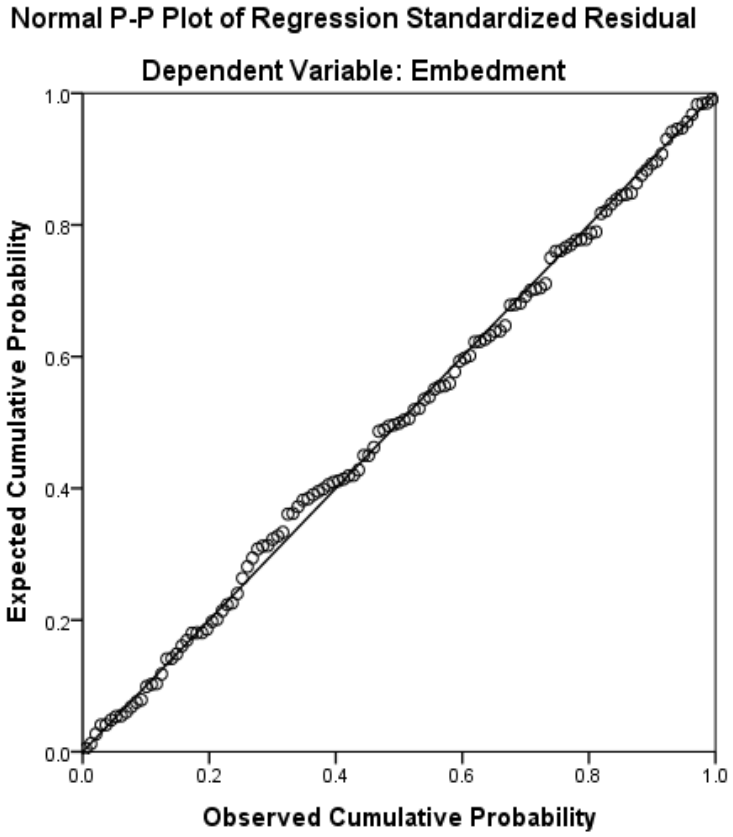

Figure 11. Normal P-P plot of expected cumulative probability versus observed cumulative probability for the DV of embedment.

Multivariate normality also could have been checked with a histogram. The regression standardized residuals for the DV of embracement follow a normal distribution with a slight negative bias. Figure 12 shows a histogram of frequency versus regression standardized residual for embracement.

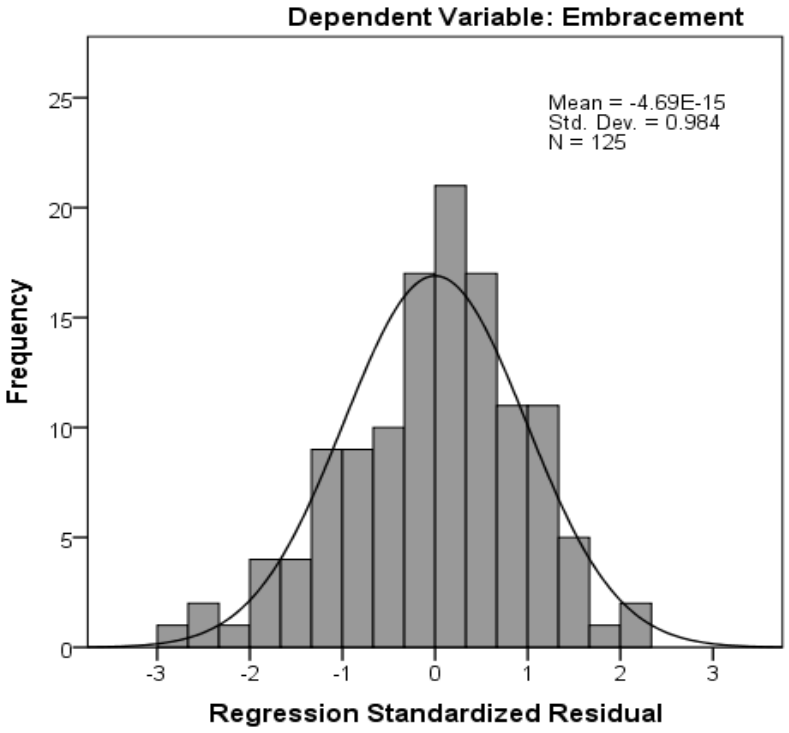

Figure 12. Histogram of frequency versus regression standardized residual for embracement.

The regression standardized residual for the DV of embedment followed a normal distribution with a slight negative bias. Figure 13 shows a histogram of frequency versus regression standardized residual for embedment.

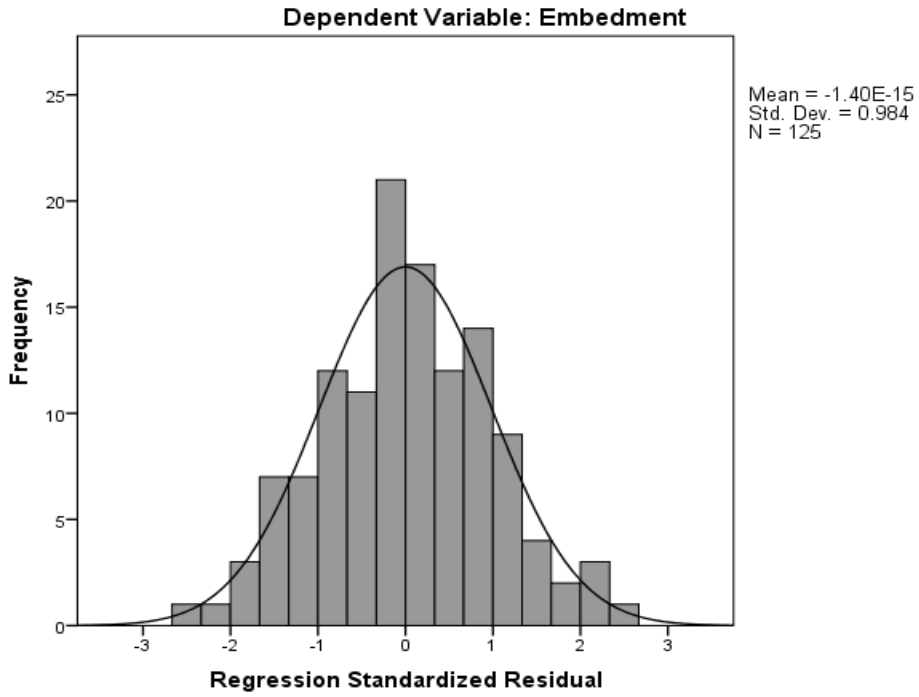

Figure 13. Histogram of frequency versus regression standardized residual for embedment.

Homoscedasticity

Homoscedasticity in a residual data plot is a good way to determine whether error terms associated with the data points remain equal along the regression line. Figures 8 and 9 illustrated the data points when regression standardized predicted values were plotted against the regression standardized residual. The relatively even number of data points above and below the 0-value centerline indicated that the DVs of embracement and embedment were homoscedastic. No visible appearance of heteroscedasticity was event from the scatterplots.

Multicollinearity

A multiple linear regression assumed that there was little or no multicollinearity in the data (Statistics Solution, 2009). Multicollinearity was checked using the variance inflation factor (VIF). If the VIF is below 10, then there is no issue with multicollinearity of the predictors. In the current study, VIF values for the regression analysis were well below 10 (see Tables 24 & 25), indicating that the predictors did not have a problem with multicollinearity.

Table 24

VIF for Embracement

Coefficients	Collinearity statistic (VIF)
Perceived relative advantage	1.8
Organizational commitment	1.8
Social computing action	1.7
Perceived ease of use	1.6

Note. Little or no indication of multicollinearity. VIF < 10 for all coefficients.

Table 25

VIF for Embedment

Coefficients	Collinearity statistic (VIF)
Perceived relative advantage	1.4
Organizational commitment	1.8
Social computing action	1.7
Perceived ease of use	1.6
Social computing consensus	1.1

Note. Little or no indication of multicollinearity. VIF < 10 for all coefficients.

Correlation Analysis

The Pearson bivariate correlation coefficient is a measure of the strength of the relationship between the IVs and the DVs that ranges from -1 to 1 (Statistics Solution, 2009). Table 26 lists all of the Pearson correlation coefficients between the IVs (predictor variables) and two DVs of embedment and embracement, respectively. The *p* values for

the correlation coefficients indicated that all but one of the correlations were significant. The exception was social computing consensus, which was close to zero, meaning no relationship.

Although the other correlation coefficients were significant, many of them were moderate or weak. Correlation coefficients greater than .70 are considered strong relationships, values below .4 are considered weak, and values between .40 and .70 are considered moderate (Cohen, Cohen, West, & Aiken, 2003). The correlation coefficients for perceived relative advantage and perceived compatibility with both DVs were strong because they were greater than .70. Perceived usefulness and social computing authority were weak because they were less than .40, and the remaining correlation coefficients were moderate.

Table 26

Pearson Bivariate Correlation Coefficients and p Values for IVs and DVs of Embracement and Embedment

Predictor	Embracement correlation coefficient (*r*)	*p*	Embedment correlation coefficient (*r*)	*p*
Perceived usefulness	.253	.002	.265	.001
Perceived ease of use	.480	.000	.539	.000
Social computing action	.491	.000	.594	.000
Social computing consensus	-.146	.052	-.041	.325
Social computing cooperation	.599	.000	.686	.000
Social computing authority	.209	.010	.228	.005
Perceived relative advantage	.867	.000	.795	.000
Perceived compatibility	.760	.000	.725	.000
Organizational commitment	.578	.000	.677	.000

Note. All correlation coefficients < 1.0.

Summary

The investigation into the research questions and subsequent multiple linear regression analysis yielded two integrated multivariate mathematical equations to explain

the variance in the DVs of embracement and embedment. The overall mathematical equation for embracement was

Embracement = -.106 + .868 x Perceived Relative Advantage + .146 x Organizational Commitment + .148 x Social Computing Action -.181 x Perceived Ease of Use + E

The variable E represented the random error associated with the embracement equation.

The overall mathematical regression equation for embedment was

Embedment = -.379 + .546 x Perceived Relative Advantage + .234 x Organizational Commitment + .183 x Social Computing Action + .141 x Social Computing Consensus + E

The variable E represented the random error associated with the embedment equation.

A stepwise multiple linear regression technique was used to find the best-fit linear regression for the embracement and embedment mathematical equations. The multiple linear regression analysis resulted in a multiple correlation coefficient (R) of .894 for embracement. Hence, the strength of the equation to predict the variance in the DV of embracement was strong, given that $R > .7$ is considered strong and $R > .9$ is considered very strong. Similarly, the multiple linear regression analysis resulted in a multiple correlation coefficient of .882 for the DV of embedment. Therefore, the strength of the embedment equation also was found to be strong.

The coefficient of multiple determination, R^2, for the embracement equation indicated that 79.8% of the variability in embracement could be explained by the stepwise-determined predictors. Furthermore, at a 95% confidence level, the data values

fell within 80% of the regression line. Similarly, the coefficient of multiple determination, R^2, for the embedment equation indicated that 77.8% of the variability in embedment could be explained by the stepwise-determined predictors. At a 95% confidence level, data values fell within 67.9% of the regression line. In both equations, perceived relative advantage contributed most significantly to the explanation of the embracement and embedment variance, followed by organizational commitment, and social computing action. Hence, the adoption of ESC, as perceived by the C-level executives who participated in this study, was strongly related to perceived relative advantage, organizational commitment, and social computing action that IT could provide to commercial organizations.

In this chapter, the multiple linear regression analysis and the bivariate correlation analysis served as quantitative and scientific methods by which the hypotheses of a predictive model for ESC adoption could be investigated. The hypothesized predictors were analyzed for their relative strength to explain the variance in the DVs of embracement and embedment.

Included in Chapter 5 is a discussion of the way the findings confirm, disconfirm, and extend the current body of knowledge and how the findings compare with those gleaned from previous research. The results are analyzed and interpreted in the context of the theoretical and conceptual framework, and the limitations of the study are presented. Recommendations for future research are offered, and the potential implications of the study for positive social change are discussed.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this quantitative study was to operationalize, test, and extend the SIM of technology adoption that was developed by Vannoy and Palvia (2010). Research on the SIM and relevant theory associated with the diffusion of innovations and IT adoption suggested that additional predictors were necessary to account for the perceptions of C-level executives toward the adoption of ESC in commercial organizations. Therefore, the SIM was extended to include an organizational innovation characteristic construct that comprised three IVs: perceived relative advantage, perceived compatibility, and organizational commitment. These three predictors have been researched and documented extensively in the research journals for their role in influencing the adoption of IT innovations. Therefore, the ESIM of IT adoption was developed to represent the social and organizational innovation characteristics that helped to explain the C-level executives' perceptions toward the adoption of ESC.

The study yielded two integrated mathematical multivariate regression equations that helped to explain the relationship between the independent variables (IVs) and the dependent variables (DVs) of embracement and embedment. The embracement equation found that perceived relative advantage, organizational commitment, social computing action, and perceived ease of use were significant predictors of IT adoption. Perceived relative advantage, organizational commitment, and social computing action were found to contribute the highest positive predictive strength toward explaining embracement of ESC technology. Perceived ease of use was found to be negatively correlated when

regressed together with perceived relative advantage, organizational commitment, and social computing action. The multiple linear regression equation for embracement was expressed as

Embracement = -.106 + .868 x Perceived Relative Advantage + .146 x Organizational Commitment + .148 x Social Computing Action -.181 x Perceived Ease of Use + E

The results of the quantitative analysis also indicated that perceived relative advantage, organizational commitment, social computing action, and social computing consensus were significant adoption predictors and contributed the highest positive predictive strength toward explaining C-level executives' perceptions of the level of embedment of ESC. The multiple linear regression equation for embedment was expressed as

Embedment = -.379 + .546 x Perceived Relative Advantage + .234 x Organizational Commitment + .183 x Social Computing Action + .141 x Social Computing Consensus + E

The analysis for bivariate correlation strength in relation to embracement found that perceived usefulness, social computing consensus, and social computing authority were weak; perceived ease of use, social computing action, social computing cooperation, and organizational commitment were moderate; and perceived relative advantage and perceived compatibility were strong (Cohen et al., 2003). Except for social computing consensus, all predictors were found to be significant ($p < .05$).

Similarly, the analysis for bivariate correlation strength in relation to embedment found that perceived usefulness, social computing consensus and social computing authority, were weak; social computing action, perceived ease of use, social computing consensus, social computing cooperation, and organizational commitment were moderate; and perceived relative advantage and perceived compatibility were strong. Except for social computing consensus, all other predictors were found to be significant ($p < .05$).

Significance of the Study

This study is significant because of the exponential growth of social computing and increased global pressure on companies to be competitive and innovative. The study can help executives to understand the factors that affect the adoption of ESC and the ways in which this emerging computing platform can engender collaborative and innovative workplace environments within their organizations. The study also is significant because it addressed a gap in the research literature by investigating technology adoption in a social computing context and it operationalized and tested the theoretically grounded SIM and extended the SIM to include an organizational innovation characteristics construct. The findings can help to guide executives in their decision making toward the planning and implementation of ESC in their organizations.

This study explored the perceived benefits and risks of ESC adoption for commercial organizations in the United States. The use of ESC has tremendous potential to foster collaboration and innovation, and add business value. Nevertheless, ESC must overcome concerns about trust, privacy, security, productivity, cultural shifts, business

models, measurement of ROI, and social network integration before it is adopted, delivers business value, and demonstrates its full potential (Shneiderman et al., 2011). If these challenges are not overcome, then ESC risks becoming an environment for specialized and limited applications only.

Interpretation of the Findings

The research confirmed that the IVs of perceived relative advantage, organizational commitment, social computing action, and social computing consensus were significant and positively related to the DVs of embedment and embracement. The results showed that the executives' perceptions of embracement of ESC were related to perceived relative advantage, organizational commitment, and social computing action and that their perceptions of embedment of ESC were related to relative advantage, organizational commitment, and social computing consensus.

The results also indicated that the executives perceived that using ESC would benefit them by improving the quality of their work, enhancing their effectiveness on the job, and facilitating their engagement in online communities and establishment of online relationships. The executives also perceived that their organizations encouraged the use of ESC and had the resources available to use the technology. They understood that their organizations had clearly stated and coherent visions of the future and that their social computing actions would result in achievement of their organizational goals. Lastly, they perceived that through social computing consensus, their employees would be able to find reasonable ways to resolve differences of opinion and support the needs of group members. I derived these facts from the collected data associated with the research

questions corresponding to the perceived relative advantage, organizational commitment, and social computing action constructs.

Perceived ease of use was found to be significant and negatively related to embracement. Moon et al. (2009) investigated whether social influence could have a significant impact on the perceived usefulness and perceived ease of use of an IT innovation for knowledge and nonknowledge groups. Moon et al. defined the knowledge groups as workers who "demand easy and rapid access to critical information to cope with the dynamic changes of business environments" (p. 27). These workers understand the value of information and knowledge, and they leverage their understanding to increase productivity (Nonaka, Toyama, & Konno, as cited in Moon et al., 2009). In contrast, nonknowledge groups lack work experience, so the quality of their work and their decision making is void of the insight and perspective necessary to make the best decisions.

Moon et al. (2009) found that knowledge groups value the perceived usefulness of an IT innovation over its perceived ease of use because the usefulness of an IT innovation supports better decision making. Hence, Moon et al. concluded that perceived usefulness is significant and positively related to IT use and adoption. In contrast, Moon et al. also found that nonknowledge workers highly value perceived ease of use because they require easy access to learn how to select from proven solutions. These findings offer interesting insight into the results of this study with respect to perceived ease of use and perceived usefulness.

This study focused solely on ESC, which comprises a variety of sophisticated social and collaborative technologies that might have contributed to the finding of a negative relationship between perceived ease of use and embracement. The most significant predictor, based upon the calculated coefficient of correlation, was perceived relative advantage, which was positively related to embedment and embracement. Perceived relative advantage has been researched extensively and has been found in the peer-reviewed literature on diffusion of innovations theory to be a strong predictor of IT acceptance and adoption. Rogers (2003) provided strong evidence of the predictive strength of perceived relative advantage toward the adoption and diffusion of IT innovations.

The conceptual framework for the ESIM was based upon the SIM, TAM, and constructs derived from diffusion of innovations theory. The combination of the SIM and the construct of organizational innovation characteristics produced the ESIM, whose nine diverse factors predict individual IT adoption. The results confirmed that except for social computing consensus, all of the other proposed factors were significant. The fact that the construct of social computing consensus was found to be insignificant was attributed to an inadequate research definition (Moore & Benbasat, 1991). The definition of social computing consensus offered by Vannoy and Palvia (2010) was not included in the cover letter or described in the survey. Although the respondents were not influenced by this definition, they were expected to answer Questions 4 to 10 based upon their experience and perceptions.

Moore and Benbasat (1991) argued that in regard to IT, "research efforts to date have led to mixed and inconclusive outcomes … inadequate definition and measurement of constructs have been identified as major causes for such outcomes" (p. 192). Thus, the relationship between social computing consensus and the DVs of embracement and embedment, respectively, warrants further research. It might benefit future researchers of ESIM to understand whether the result of the social computing consensus significance changes when a definition is provided for this variable.

The results associated with perceived relative advantage and organizational commitment were consistent with findings from Davis (1989) and Rogers (2003) on the acceptance and diffusion of IT innovations. Empirical evidence from the current study confirmed that these factors (i.e., predictors) were independent and significant, suggesting that these theoretical and empirical factors are strong predictors of IT adoption in a social context. Furthermore, hypothesis testing confirmed that except for social computing consensus, all of the social influence IVs were statistically significant and positively related to the DVs of embracement and embedment, respectively. Given that social computing action and social computing consensus had not been operationalized in earlier studies, no comparison could be made.

In regard to perceived ease of use, the results confirmed that the IV was significant but negatively correlated to the DV of embedment. The negative correlation was attributed to the respondents' perceptions of the ease of use of ESC applications. Given that ESC applications often work in conjunction with other IT technologies (i.e., network devices, cell phones, mobility applications, etc.), it was possible that the C-level

executives perceived that increased adoption would lead to more difficulty in the use of ESC applications. Perhaps this knowledge and insight could help CIOs and CTOs to better prepare their organizations by offering educational programs and technology demonstrations. Educational programs and product demonstrations often are effective ways to help employees overcome the challenges associated with working with new technologies. In addition, C-level executives who are aware of the negative correlation between perceived ease of use and embedment could require that application developers of ESC technologies provide better integration and simplification of future ESC applications.

Limitations of the Study

The study was conducted using a multiple linear regression analysis to explore C-level executives' perceptions about the adoption of ESC, a specific category of IT innovation. As a result, several limitations to the generalizability of the results exist. The structure of a quantitative survey meant limitations in the complexity of questions that were asked, the order in which the questions were administered, and the spontaneity with which the respondents answered them. In addition, the nature of a quantitative survey does not permit the observation and capture of nonverbal behavior.

I did not collect demographic data related to gender, age, education, or experience level. Therefore, no conclusion or insight could be drawn about the effect of any of these factors on the executives' perceptions of ESC adoption. These factors might have influenced IT adoption and might have had an impact on the generalizability of the results.

During the study, I noted that the response rate was lower than expected. It was estimated that a response rate of 1% to 3% would be achieved, but the actual response rate was .89%. Data were collected from a survey completed by executives who were invited via e-mail only to join the study; therefore, the methodology imposed a limitation comparison of responses and response rates for different data capture approaches (e.g., via post office mail or face to face). Data collection via e-mail did not allow me to confirm each respondent's position, organization type, or organization size visually. In addition, the trustworthiness of the e-mail responses was limited because each respondent's position (e.g., CIO or CTO) was taken at face value by me. There were no secondary ways to validate the respondents' claims of having CIO or CTO responsibilities for their respective organizations.

The focus of the study was the adoption of a single IT innovation category, namely, ESC, in a social context; thus, the generalizability of the results was limited when compared to the adoption of other innovations in different contexts. For example, C-level executives' perceptions of the adoption of ESC in the context of governmental or perhaps nonprofit organizations would be different from those of C-level executives whose behaviors are motivated by different strategic and commercial goals. If the research had been conducted in a different country, cultural or political influences could have had either a moderating influence or a more significant effect on the identified predictors of ESC adoption.

An argument could be made for the benefits of studying a single IT innovation category. According to Turner (2007), "The study of a single innovation has the effect of

controlling for technology and enhancing the comparability of survey results relevant to other contextual factors of interest" (p. 232). The results showed positive and significant relationships between the IVs of perceived relative advantage, social computing action, organizational commitment, and social computing consensus and the DVs of embracement and embedment. Thus, the results supported the generalizability of the study in a social context, with acknowledgement of the aforementioned limitations.

Social Construct Consideration

The construct of social influence pertaining to the ESIM contains the four IVs of social action, social authority, social cooperation, and social consensus, all of which were defined and developed by Vannoy and Palvia (2010). In contrast, the technology acceptance theory, developed by Moon et al. (2009), holds the construct of social influence and its four IVs of subjective norm, image, visibility, and voluntariness. These variables and their definitions were derived by theorists Agarwal and Prasad (1997), Price and Fischer (1992), Venkatesh and Davis (2000), and Warshaw (1980), respectively, all of whom were cited in Moon et al. (2009). Hence, when relating the results of this study to prior results, researchers should note the differences in the construct variables, the ways in which the survey questions were measured, and how the questions related back to the construct variables.

At present, there is no standard for the construct of social influence or agreement within the research community on the definitions or measurement of the construct variables. Moore and Benbasat (1991) raised this concern and stated, "Inadequate measurement of constructs have plagued IS [information system] research in a wide

variety of topics" (p. 193). In the study, effort was made to operationalize the SIM and properly measure the executives' perceptions of adopting ESC, an IT innovation.

Survey Instrument Consideration

In the design of the survey, I decided that definitions of social computing and ESC would be included in the e-mail invitation. In retrospect, it might have been of further use and assistance to the respondents to provide them with a list of definitions for the construct variables. In addition, it might have been helpful to the respondents to receive an illustration of the ESIM of technology adoption. This visual might have improved their understanding of the relationship between the predictor variables (i.e., the IVs) and the DVs of embedment and embracement.

Recommendations for Further Research

The survey questions focused upon C-level executives' perceptions of the role of social influence and organizational innovation characteristics on the adoption of ESC. The survey did not collect demographic data on gender, age, education, or experience level. Therefore, no conclusion or insight could be drawn about the effect of any of these factors on the executives' perceptions of ESC adoption. Future researchers might be interested in determining whether gender, age, education, or experience level have an effect on C-level executives' perceptions of ESC adoption and whether they alter the correctional coefficient values of the IVs or the IVs associated with the embracement and embedment equations, respectively.

The sample comprised CIOs and CTOs. A potential extension of this research would be to examine the perceptions of other C-level executives (e.g., CEOs, CFOs,

COOs, etc.) and compare their perceptions to those of the CIOs and CTOs who participated in this study. In addition, the study focused upon the adoption of ESC in commercial organizations, but it might be worthwhile to examine the perceptions of C-level executives to adopt ESC in other contexts (i.e., government agencies, universities, etc.). Turner (2007) found that because the determinants of IT adoption could be context specific, comparing the results of the ESIM for different samples and in different contexts could help to identify the appropriate predictors and improve the predictive capability of the model.

Future researchers also could benefit by expanding the reference frame to a broader set of users (i.e., technical and nontechnical managers, employees, etc.) to determine whether the same perceptions exist among individual users of ESC technology. Alternatively, conducting the research in countries other than the United States could provide interesting perspectives on whether cultural and/or political perceptions make a difference in the adoption of ESC. Such global research could expand current understanding of the factors that contribute significantly to ESC adoption and could help to answer one very important question: Are the predictors the same, regardless of cultural or political context, or do other significant factors exist that have not yet been considered?

This research also would add to the body of knowledge and help to determine whether there is a statistically significant relationship between organizations that use ESC and their rates of innovation, perhaps as measured by the number of patents registered per organization. Christensen (1997) provided examples of the ways in which technological

innovations can disrupt entire industries. Therefore, it would be of great benefit to understand whether organizations that adopt ESC create more disruptive innovations.

Implications and Recommendations for Action

Research Implications

This research has the potential to have a positive impact on social change within organizations and society in general. The adoption of ESC is already having an impact on traditional business practices and the means by which these businesses compete in local and global marketplaces. Contemporary organizations rely heavily upon consumer feedback on their products and services to ensure that they stay aware of customers' preferences and achieve or maintain a competitive advantage. Conversely, consumers exchange product and service ideas, comments, and perspectives with other consumers via online chats, community forums, and blogs to influence current business practices, future product and service designs, development, and marketing. Hence, ESC applications provide the technology and platform by which business and consumers benefit from the exchange of ideas.

Organizations and societies that continue to operate based upon the misguided perception that IT adoption is not positively and significantly influenced by social factors will find it increasingly more difficult to compete in local and global marketplaces. The results of this study showed that social factors are significant and have a positive influence on the adoption of IT, especially in countries where social computing technology is already embraced and embedded in society.

Recommendations for Action

Perceived relative advantage. Organizations should leverage ESC to build brand awareness by informing individuals of the benefits of their products or services and requesting feedback for continuous improvement. In addition, organizations should leverage blogs, forums, and communities to poll individuals for new ideas that can influence future product or service innovations.

Organizational commitment. Organizations should use ESC to communicate their strategies and articulate the ways in which the organizations are committed to achieving their goals. They should social forums to obtain feedback on how well the organizations are executing their strategic and tactical plans and to open dialogue for constructive improvement.

Social computing actions. Organizations should use ESC to communicate the ways in which members of the organizations can take action to resolve issues, achieve organizational goals, and increase shareholder value.

Perceived ease of use. The negative relationship between perceived ease of use and ESC adoption variables would indicate that opportunities exist for organizations to simplify the large array of social tools available to them and integrate them into more seamless applications.

Conclusion

The objective of this study was to investigate the role of social influence and organizational innovation characteristics on the adoption of ESC. Critical factors (i.e., the IVs) influencing C-level executives' decision making toward the adoption of ESC were

identified. The study offered a new model, the ESIM of technology adoption, to illustrate the relationship of the IVs to the adoption DVs of embedment and embracement. The model consisted of three constructs and nine factors based upon the theoretical foundation and framework described in Chapter 2. The three constructs and nine factors were the basis of the research questions and hypotheses.

A survey was administered and data were collected from 125 CIOs and CTOs from small, medium, and large U.S. organizations. A multiple linear regression analysis and a Pearson's bivariate correlations analysis were conducted on the data, and each hypothesis was tested. The descriptive results of the study were presented in Chapter 4. The perceptions of the participating CIOs and CTOs were at the center of the study; the individuals in these organizational positions are the decision makers responsible for the investment and deployment of large-scale enterprise IT applications.

The data analysis and hypothesis testing indicated that the C-level executives in the study perceived relative advantage, organizational commitment, and social computing action as the most significant factors in any decisions to adopt ESC. The most significant and strongly correlated factor influencing the adoption of ESC was perceived relative advantage. As described in Chapter 2, prior research on the diffusion of innovations and technology acceptance supported this finding (Davis, 1989; Rogers, 2003). It is interesting that perceived relative advantage maintained a strong correlation to adoption of IT (i.e., ESC) in a social context. This finding, along with the others presented in Chapter 4, contributes significantly to research on IT adoption. The findings highlight the importance of understanding C-level executives' perceptions toward the adoption of

ESC. The study showed that not only perceived relative advantage but also organizational commitment, social computing action, and social computing consensus are important factors. These findings can help C-level executives to better plan and implement ESC in their respective organizations and derive operational effectiveness, efficiency, and business value from its adoption.

Businesses must remain competitive if they are to thrive. C-level executives understand the importance of ESC as a strategic way to integrate social and collaborative applications with business processes and keep their organizations healthy. They also are aware of the increasing influence of social technologies on business practices, consumer behavior, and consumer preferences.

Today, users of social enterprise applications, including bloggers and members of online communities, are influencing the outcomes of social and political decisions. In addition, communities of knowledge are having a significant impact on the product and development decisions that many corporations are developing. The increasing influence of the online community is challenging and, in some cases, is disrupting business models and industries. Consider the online taxi and share ride service Uber.com. Socially oriented IT tools are disrupting, changing, and improving business practices, so it is important to understand the social and organizational innovation factors influencing IT adoption.

C-level executives now have a model (i.e., ESIM) to help them to understand the factors influencing IT adoption in a social context. Hence, C-level executives must give ESC serious consideration to capitalize on the feedback of online communities and

consumers, who are willing to express their concerns and contribute ideas (T. Zhou, 2011). It is then up to the C-level executives to listen to these concerns and incorporate their ideas and preferences into current and future products and services.

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Appendix A: Field Test of Enterprise Social Computing Survey

Interviewer Instructions

I am conducting a Field Test of my PhD survey instrument and would appreciate your review and feedback regarding the clarity, readability, and deliverability of the interview questions. Your feedback will help me refine the survey before I distribute the survey to corporate CIO's for their responses.

For your awareness, my PhD study will investigate the social, behavioral, and organizational factors that cause organizational leaders to adopt or reject enterprise social computing.

The data collected from the survey will help operationalize a theoretical model I am studying and will extend, entitled "The Social Influence Model of Technology Adoption" (Vannoy & Palvia, 2011).

Definitions

As per Vannoy and Palvia (2011), **Social Computing** is defined as "the intra-group social and business actions, practiced through group consensus, group cooperation, and group authority, where such actions are made possible through the mediation of information technologies, and where group interaction causes members to conform, and influences others to join the group" (p. 149).

Enterprise Social Computing (ESC) is defined as the application of social and collaborative computing technologies within corporate environments.

Social Computing Action:

Please answer the questions below, using the 5-point Likert scale.

1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree

1. My organization's social computing actions are planned and directed toward clear goals.

1 2 3 4 5

2. I believe social computing actions could be used toward social and group activities (e.g., point-to-point file sharing, instant messaging, text messaging).

1 2 3 4 5

3. My organization has a clearly stated and coherent shared vision of the future.

1 2 3 4 5

4. The use of social computing tools is important towards achieving my organization's vision and goals.

1 2 3 4 5

Social Computing Consensus:

Please answer the questions below, using the five point Likert scale.

1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree

5. My organization's use of social computing allows employees to be able to arrive at a reasonable way to resolve differences of opinion.

1 2 3 4 5

6. I believe that the adoption of ESC presents risk to protected trade secrets.

1 2 3 4 5

7. I believe that the adoption of ESC presents risks to patents.

1 2 3 4 5

8. I believe that the adoption of ESC presents risks to copyrights.

1 2 3 4 5

9. I believe that network security is an important factor towards my decision to adopt enterprise social computing.

1 2 3 4 5

10. I am concerned that adoption of ESC presents corporate security risks.

1 2 3 4 5

11. I believe the needs of a group are more important than the needs of the individual.

1 2 3 4 5

Social Computing Cooperation:

Please answer the questions below, using the 5-point Likert scale.

1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree

12. It is important to be a member of an online group, community, or community of common interest.

1 2 3 4 5

13. Time should be all allowed for exploratory learning and skills development, using social computing tools.

1 2 3 4 5

14. I believe people are honest and open when working in teams with social computing tools.

1 2 3 4 5

15. I am concerned about the governance structures of on-line communities.

1 2 3 4 5

16. ESC allows errors and problems to be shared openly and recognized as opportunities for organizational learning.

1 2 3 4 5

17. I believe my organization allows external partners and customers to communicate and share with our organization via social computing tools.

1 2 3 4 5

Social Computing Authority:

Please answer the questions below, using the 5-point Likert scale.

1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree

18. I believe that a relationship of authority exists when individuals perform some action that is dictated by others.

1 2 3 4 5

19. I believe in group-authority.

1 2 3 4 5

20. I believe multiple viewpoints are encouraged and cultivated with social computing tools.

1 2 3 4 5

21. I believe open productive debates are encouraged and cultivated with social computing tools.

1 2 3 4 5

Perceived Ease of Use:

Please answer the questions below, using the 5-point Likert scale.

1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree

22. Learning to apply ESC software is easy for me.

1 2 3 4 5

23. I find it easy to get ESC software to do what I want to do.

1 2 3 4 5

24. It would be easy for me to become skillful at using ESC software.

1 2 3 4 5

25. I would find ESC software easy to use.

1 2 3 4 5

Perceived Usefulness:

Please answer the questions below, using the 5-point Likert scale.

1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree

26. Using ESC would increase my productivity in my job.

1 2 3 4 5

27. Using ESC would improve my performance in my job.

1 2 3 4 5

28. Using ESC would enhance my effectiveness in my job.

1 2 3 4 5

29. I would find ESC useful in my job.

1 2 3 4 5

Perceived Relative Advantage:

Please answer the questions below, using the 5-point Likert scale.

1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree

30. I believe it benefits me to engage in on-line communities.

1 2 3 4 5

31. I believe it benefits me to build on-line relationships.

1 2 3 4 5

32. I believe ESC tools are productive tools.

1 2 3 4 5

33. Using ESC enables me to accomplish task more quickly.

1 2 3 4 5

34. Using ESC improves the quality of my work.

1 2 3 4 5

35. Using ESC makes it easier to do my job.

1 2 3 4 5

36. Using ESC enhances my effectiveness on the job.

1 2 3 4 5

37. Using ESC gives me greater control over my work.

1 2 3 4 5

Perceived Compatibility:

Please answer the questions below, using the 5-point Likert scale.

1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; 5 = strongly agree

38. I think that using ESC fits well with the way I like to work.

1 2 3 4 5

39. Using ESC fits into my work style.

1 2 3 4 5

Organizational Commitment:

Please answer the questions below, using the 5-point Likert scale.

1 = strongly disagree; 2 = disagree; 3 = neither agree or disagree 4 = agree; 5 = strongly agree

40. My organization is committed to supporting my effort to use ESC.

1 2 3 4 5

41. My organization strongly encourages the use of ESC.

1 2 3 4 5

42. My organization will recognize my efforts in using ESC.

1 2 3 4 5

43. The use of ESC is important to my organization.

1 2 3 4 5

44. I have the resources necessary to use ESC.

1 2 3 4 5

Background Information

What is your position/title?_____

On average, how many hours per day do employees in your business unit use social computing? 1 2 3 4 5 6 7 8 other. _____

Demographic Information

For the following four demographic items, please insert/select the most appropriate response.

45) What is your job position/title? _____

46) What is the name of the business unit or organization where you work?

_____

47) What is your business unit or organization's market position? (Check only one):

_ Dominant market leader

_ Major competitor

_ Minor competitor

_ Other (please specify)

48) What is the size of your organization? (Check only one):

_ 0 - 10 employees

_ 11 - 100 employees

_ 101 - 500 employees

_ 501 - 1000 employees

_ 1001 – 5000 employees

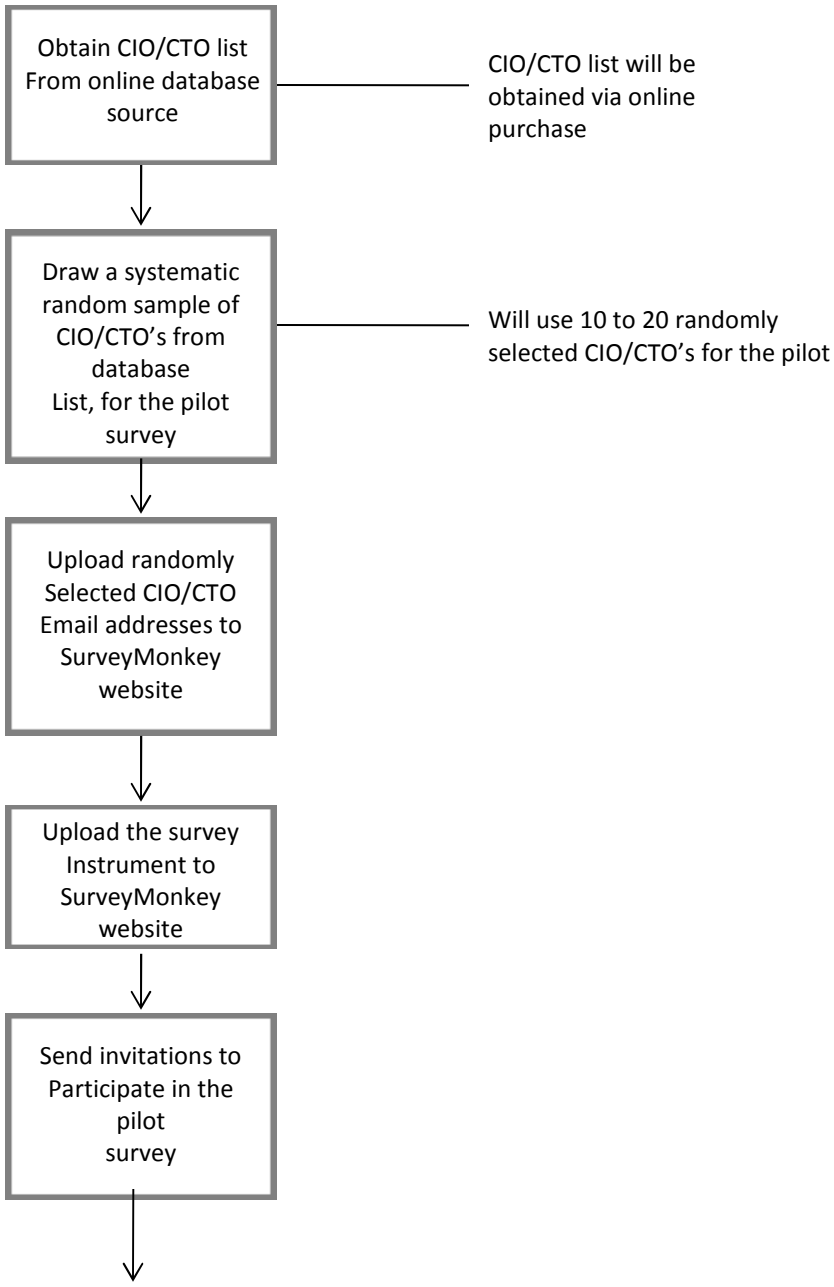
_ over 5001 employees

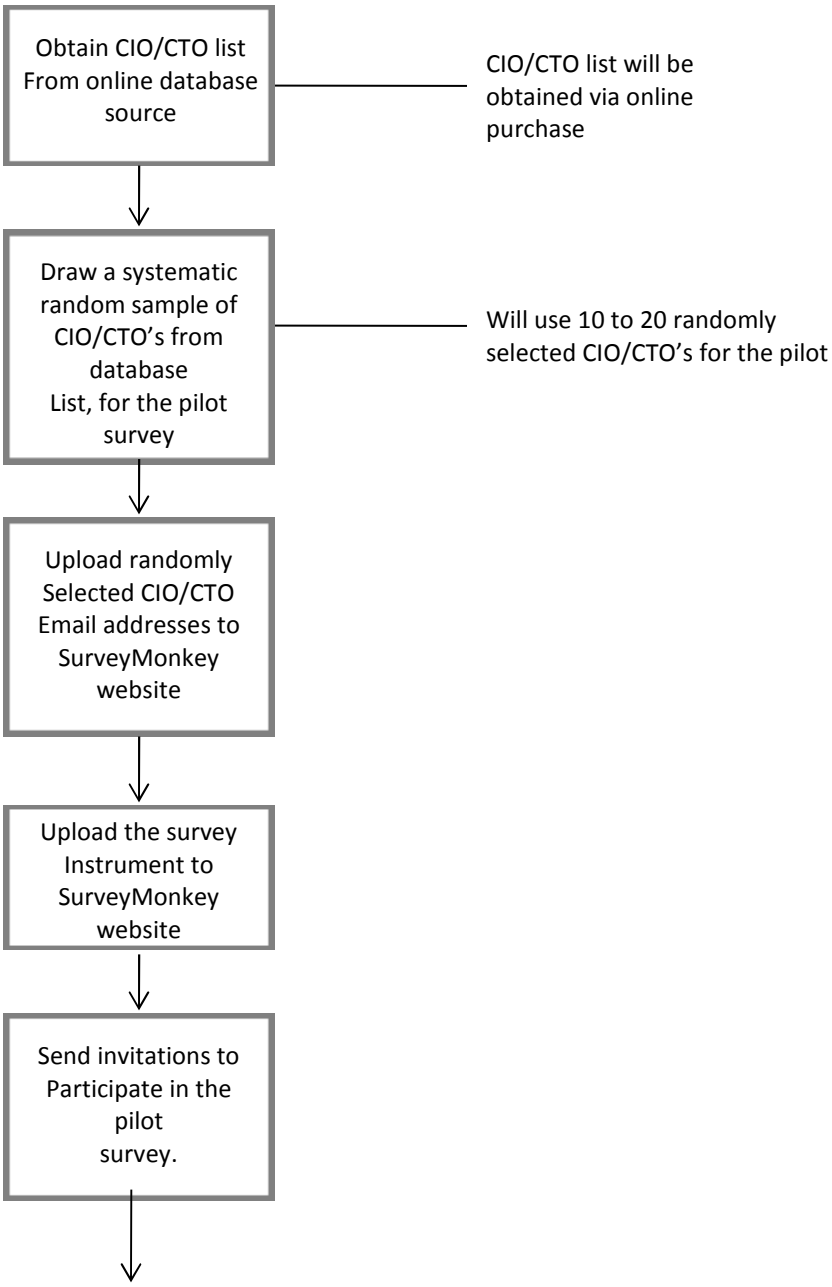
49. Please use the space below for any write-in comments you would like to make regarding any survey question or the survey design.

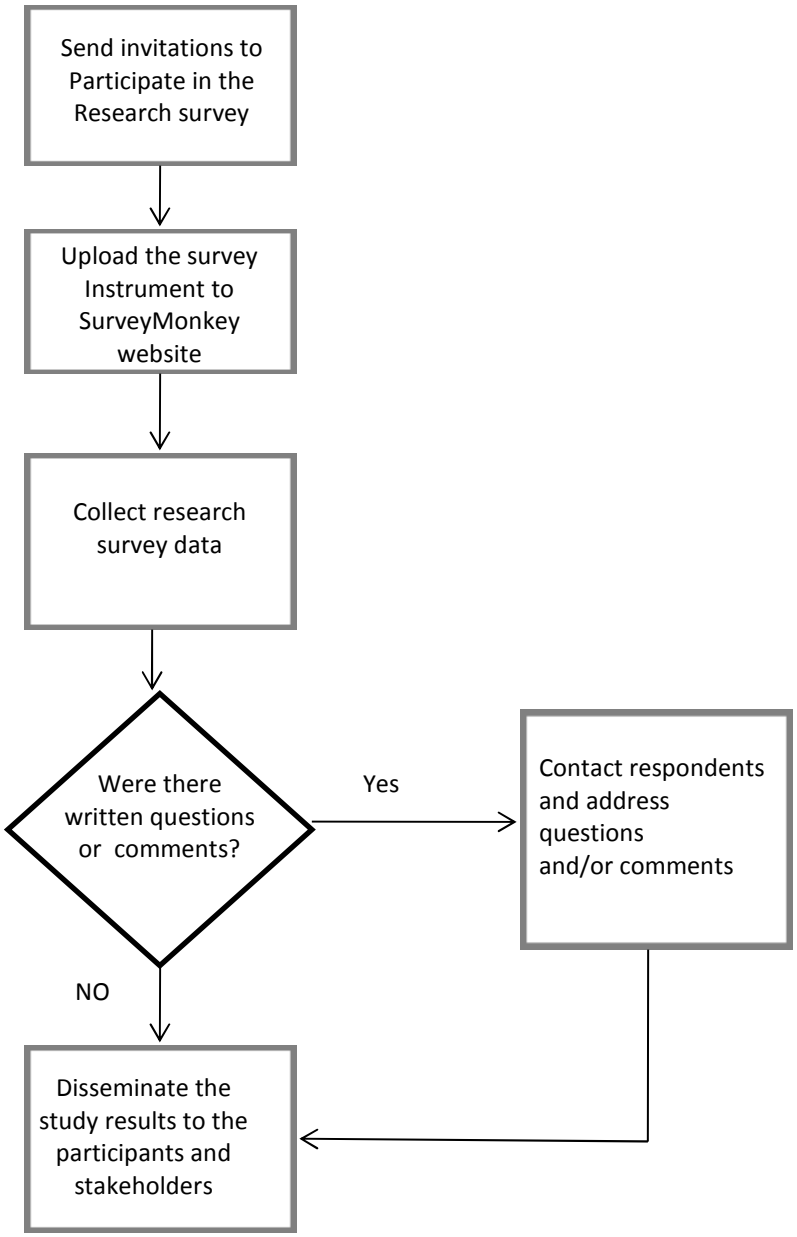
_____

_____

Appendix B: Diagram of Data Collection Steps




Obtain CIO/CTO list From online database source
CIO/CTO list will be obtained via online purchase
Draw a systematic random sample of CIO/CTO's from database List, for the pilot survey
Will use 10 to 20 randomly selected CIO/CTO's for the pilot
Upload randomly Selected CIO/CTO Email addresses to SurveyMonkey website
Upload the survey Instrument to SurveyMonkey website
Send invitations to Participate in the pilot survey.


Send invitations to Participate in the Research survey
Upload the survey Instrument to SurveyMonkey website
Collect research survey data
Were there written questions or comments?
Yes
Contact respondents and address questions and/or comments
NO
Disseminate the study results to the participants and stakeholders

Appendix C: SPSS Analysis Report for Pilot Study

```
GET
 FILE='C:\Users\IBM_ADMIN\AppData\Local\Temp\Temp1_Data_All_141023.zip\result.sav'.
DATASET NAME DataSet1 WINDOW=FRONT.

SAVE OUTFILE='E:\PhD Dissertation\Pilot Data\All Responses\pilot_results.sav'
 /COMPRESSED.
RELIABILITY
 /VARIABLES=q0001_0001 q0002_0001 q0003_0001 q0004_0001 q0005_0001 q0006_0001
q0007_0001 q0008_0001 q0009_0001 q0010_0001 q0011_0001 q0012_0001 q0013_0001 q0014_0001
q0015_0001 q0016_0001 q0017_0001 q0018_0001 q0019_0001 q0020_0001 q0021_0001 q0022_0001
q0023_0001 q0024_0001 q0025_0001 q0026_0001 q0027_0001 q0028_0001 q0029_0001 q0030_0001
q0031_0001 q0032_0001 q0033_0001 q0034_0001 q0035_0001 q0036_0001 q0037_0001 q0038_0001
q0039_0001 q0040_0001 q0041_0001 q0042_0001 q0043_0001 q0044_0001
 /SCALE('ALL VARIABLES') ALL
 /MODEL=ALPHA
 /STATISTICS=DESCRIPTIVE SCALE CORR
 /SUMMARY=TOTAL.
```

Reliability

[DataSet1] E:\PhD Dissertation\Pilot Data\All Responses\pilot_results.sav

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	9	90.0
	Excluded[a]	1	10.0
	Total	10	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.944	.935	44

Item Statistics

	Mean	Std. Deviation	N
q0001_0001	2.4444	.88192	9
q0002_0001	3.7778	.83333	9
q0003_0001	2.7778	1.20185	9
q0004_0001	2.7778	1.20185	9
q0005_0001	2.8889	1.16667	9
q0006_0001	3.5556	.88192	9
q0007_0001	3.5556	.88192	9
q0008_0001	3.5556	.88192	9
q0009_0001	4.0000	.86603	9
q0010_0001	3.5556	1.01379	9
q0011_0001	4.0000	.70711	9
q0012_0001	3.2222	1.39443	9
q0013_0001	3.5556	1.13039	9
q0014_0001	3.2222	.66667	9
q0015_0001	3.5556	.72648	9
q0016_0001	3.7778	.66667	9
q0017_0001	3.1111	1.16667	9
q0018_0001	3.4444	.88192	9
q0019_0001	2.8889	1.05409	9
q0020_0001	3.4444	.88192	9
q0021_0001	3.4444	1.01379	9
q0022_0001	3.2222	.66667	9
q0023_0001	3.1111	.78174	9
q0024_0001	3.5556	.52705	9
q0025_0001	3.5556	.72648	9
q0026_0001	3.1111	1.26930	9
q0027_0001	3.0000	1.11803	9
q0028_0001	3.1111	1.26930	9
q0029_0001	3.2222	1.30171	9
q0030_0001	3.1111	1.16667	9
q0031_0001	3.0000	1.22474	9
q0032_0001	3.0000	1.11803	9
q0033_0001	2.8889	1.05409	9
q0034_0001	2.6667	.86603	9
q0035_0001	3.0000	1.22474	9
q0036_0001	3.0000	1.11803	9
q0037_0001	2.5556	.72648	9
q0038_0001	3.0000	1.11803	9
q0039_0001	3.0000	1.11803	9
q0040_0001	2.5556	.88192	9
q0041_0001	2.3333	.86603	9
q0042_0001	2.4444	.88192	9
q0043_0001	2.2222	.97183	9
q0044_0001	2.3333	.70711	9

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
q0001_0001	135.1111	537.361	.676	.	.942
q0002_0001	133.7778	553.194	.303	.	.944
q0003_0001	134.7778	582.944	-.321	.	.950
q0004_0001	134.7778	538.694	.460	.	.944
q0005_0001	134.6667	526.500	.708	.	.942
q0006_0001	134.0000	584.250	-.452	.	.949
q0007_0001	134.0000	584.250	-.452	.	.949
q0008_0001	134.0000	584.250	-.452	.	.949
q0009_0001	133.5556	578.278	-.318	.	.948
q0010_0001	134.0000	601.500	-.739	.	.951
q0011_0001	133.5556	550.528	.445	.	.944
q0012_0001	134.3333	505.500	.930	.	.940
q0013_0001	134.0000	523.500	.793	.	.941
q0014_0001	134.3333	540.250	.809	.	.942
q0015_0001	134.0000	580.750	-.443	.	.948
q0016_0001	133.7778	544.694	.663	.	.943
q0017_0001	134.4444	554.528	.180	.	.946
q0018_0001	134.1111	551.611	.323	.	.944
q0019_0001	134.6667	529.000	.736	.	.942
q0020_0001	134.1111	528.861	.891	.	.941
q0021_0001	134.1111	523.361	.892	.	.941
q0022_0001	134.3333	569.250	-.123	.	.946
q0023_0001	134.4444	558.278	.186	.	.945
q0024_0001	134.0000	567.750	-.090	.	.946
q0025_0001	134.0000	567.500	-.065	.	.946
q0026_0001	134.4444	508.778	.967	.	.939
q0027_0001	134.5556	517.278	.929	.	.940
q0028_0001	134.4444	511.528	.917	.	.940
q0029_0001	134.3333	508.500	.947	.	.940
q0030_0001	134.4444	518.278	.869	.	.940
q0031_0001	134.5556	519.028	.811	.	.941
q0032_0001	134.5556	519.278	.888	.	.940
q0033_0001	134.6667	523.250	.859	.	.941
q0034_0001	134.8889	527.861	.934	.	.941
q0035_0001	134.5556	517.028	.848	.	.941
q0036_0001	134.5556	517.278	.929	.	.940
q0037_0001	135.0000	533.750	.938	.	.941
q0038_0001	134.5556	514.528	.986	.	.940
q0039_0001	134.5556	514.528	.986	.	.940
q0040_0001	135.0000	529.250	.881	.	.941
q0041_0001	135.2222	534.694	.757	.	.942
q0042_0001	135.1111	537.361	.676	.	.942
q0043_0001	135.3333	536.500	.629	.	.942
q0044_0001	135.2222	550.944	.432	.	.944

Scale Statistics			
Mean	Variance	Std. Deviation	N of Items
137.5556	565.778	23.78608	44

Appendix D: Model Summary for Embracement

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics: R Square Change	Change Statistics: F Change	Change Statistics: df1
1	.867[a]	.751	.749	.42190	.751	371.805	1
2	.886[b]	.784	.781	.39454	.033	18.657	1
3	.890[c]	.792	.786	.38944	.007	4.216	1
4	.894[d]	.798	.792	.38459	.007	4.071	1

Model Summary

Model	Change Statistics: df2	Change Statistics: Sig. F Change	
1	123	.000	
2	122	.000	
3	121	.042	
4	120	.046	1.852

a. Predictors: (Constant), Perceived Relative Advantage
b. Predictors: (Constant), Perceived Relative Advantage, Organizational Commitment
c. Predictors: (Constant), Perceived Relative Advantage, Organizational Commitment, Social Computing Action
d. Predictors: (Constant), Perceived Relative Advantage, Organizational Commitment, Social Computing Action, Perceived Ease of Use
e. Dependent Variable: Embracement

Appendix E: Model Summary for Embedment

Model Summary							
					Change Statistics		
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1
1	.795[a]	.631	.628	.43200	.631	210.587	1
2	.862[b]	.743	.739	.36186	.112	53.303	1
3	.876[c]	.768	.762	.34554	.025	12.797	1
4	.882[d]	.778	.771	.33940	.010	5.415	1

Model summary			
	Change statistics		
Model	df2	Sig. F Change	
1	123	.000	
2	122	.000	
3	121	.001	
4	120	.022	1.929

a. Predictors: (Constant), Perceived Relative Advantage
b. Predictors: (Constant), Perceived Relative Advantage, Organizational Commitment
c. Predictors: (Constant), Perceived Relative Advantage, Organizational Commitment, Social Computing Action
d. Predictors: (Constant), Perceived Relative Advantage, Organizational Commitment, Social Computing Action, Social Computing Consensus
e. Dependent Variable: Embedment

IRB approval #09-03-14-0050511