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UNDERSTANDING THE DETERMINANTS OF USER ACCEPTANCE OF ENTERPRISE INSTANT MESSAGING: AN EMPIRICAL STUDY

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Abstract

As modern organizations increasingly depend on information systems (IS) to enhance work productivity and seek new business opportunities, communication effectiveness has become one of the key factors that underlie the effective performance of IS implementations and applications. Instant Messaging (IM) presents a revolution in enterprise communication. As more organizations are findings ways to utilize this near-synchronous computing communication technology to enhance communication effectiveness in the workplace, there is a compelling need to understand the factors that are important for the adoption of enterprise IM. We have developed an integrative model based on constructs of the existing IT adoption models as well as theories on motivation, innovation diffusion, and critical mass. Using responses from 140 intended subjects, we have found the results of survey data support the contentions that perceived usefulness, compatibility, enjoyment, and security are significant predictors of intention to use enterprise IM. Although perceived connectivity did not predict the intention directly, it did indirectly through perceived usefulness and perceived ease of use. Implications and future research are discussed.

Keywords: enterprise instant messaging; motivation; innovation diffusion; critical mass; technology adoption; structural equation modeling (SEM) 1.

INTRODUCTION

As organizations increasingly depend on information systems (IS) to enhance their work productivity and seek new business opportunities [1], inter-organizational collaboration [2] in terms of communication effectiveness has become one of the prominent factors for the success of IS implementations and applications. Email, the standard enterprise electronic communication medium until now, is beginning to be considered insufficient for real-time electronic communications [3]. Instant messaging (IM), the most popular incarnation of near-synchronous computing text chat technology among teenagers and recreational users [4], is embarking on the business arena and could morph into an indispensable business application with its functionality for inter-action and outer-action [5]. This near-synchronous computing interactive communication technology not only supports informal communication in the workplace where email, phone, and fax are already widely adopted but also facilitates some of the processes that make evasive enterprise-wide information sharing possible. Providing presence awareness and event notification, IM presents a revolution in enterprise communication and is primarily driven by individual employees to improve communications at work and to stay connected with their extended social networks. To respond to the end-user demand and to find ways to utilize this computing technology, many organizations are keen to understand how their employees would adopt IM to communicate with their organizational constituents. As such, there is a compelling and timely need to understand the salient factors that are important for the adoption of enterprise IM at the individual level.

Motivated by recent research agenda that calls for further investigation of IM acceptance among employees in a business environment [6], we conjecture that timely initiatives on IM in a business context may help explain how instantaneous communication technology affects an organization in the relational aspect of business communication and the way individual employees collaborate with each other. We further presuppose that

the drivers for the adoption of IM in a business context are different than for other types of information technology (i.e., email and voice mail) used in a number of technology acceptance studies because none of them took into consideration the unique characteristics of IM such as synchronous responses and immediate presence notification amid an employee's peers and its adoption process in a business context. The main difference between the proposed framework of this research and the original technology acceptance model (TAM) is the addition of two motivational constructs, the concerns of information integrity and safety in the organization, two technology diffusion constructs, and perceived connectivity in a critical mass. We believe this theoretical extension responds to the call for inclusion of external variables for technology acceptance research in any particular technological phenomenon [7]. In essence, employees are adopting new business communication technology as they demand more flexible and efficient ways of working and are becoming more empowered and knowledgeable with communication technology. The rise of end-user influence in IT decision making is based on drivers such as improved job satisfaction, reduced stress, enhanced productivity, and flexile and remote working.

In general, IM is diversified for two different purposes: Personal Instant Messaging (PIM) For personal entertainment use and Enterprise Instant Messaging (EIM) for business communication use. In this study, we are only focusing on EIM, which integrates synchronous and asynchronous communications and may build a sense of social presence and community, diminish transactional distance, and reduce the potential for misunderstanding [8]. According to Osterman Research Inc. [9], EIM would be as pervasive as email in virtually all businesses by 2010, and more and more organizations are evaluating EIM for a possible business computing application. This paper aims to present an empirical study on individual-level IM acceptance in enterprise, which has become a crucial subject in organizational computing. By advancing technology acceptance theories and presenting an integrative research framework, we believe that the factors that have significant impact on the acceptance of EIM can pragmatically help managers to understand how employees tend to adopt EIM and thereby devise strategic solutions to the deployment of IM technologies in

organization. Early empirical work such as Li et al. [6] proposed a model for understanding individual IM adoption. Yet it primarily sheds light on PIM for general entertainment purposes, leaving the area of EIM research relatively unexplored. In an effort to contribute to the literature, this paper is one of the early initiatives to fill this void in research.

The primary objective of this study is to investigate the salient factors responsible for the adoption of EIM. By focusing on IM use in the context of enterprise computing communication, this article bridges the research gap between IM use and enterprise stance toward technology adoption. Drawing on research in information systems (i.e., technology acceptance, technology diffusion) and cognitive psychology (i.e., critical mass), we attempt to advance a research model for gauging EIM acceptance among corporate employees. In addition to extending previous research on technology acceptance, this work furthers our understanding of innovative communication technology adoption in a business context that is driven by the rise of end-user influence in IT decision making. By incorporating cognitive psychological variables and innovative diffusion concerns into technology acceptance and validating with data from corporate subjects across industries, we postulate that the proposed integrative research model presents high explanatory power and extends this body of research. The rest of the paper is organized as follows. In the next section, we briefly discuss the background of EIM and the foundation of various theories that are related to adoption of information technologies, namely, technological acceptance theories, theory of critical mass, and innovation diffusion theory. Then, we provide an overview of the research model and the hypotheses, followed by a description of the methodology and the data analysis results. In the next section, the results are discussed and implications are drawn. Last, we describe the limitations of the study and suggest the future avenues for EIM research.

BACKGROUND AND RESEARCH MOTIVATIONS

As the newest and most popular incarnation of near-synchronous text chat Technologies, IM service can trace its roots back to 1996 when Mirabilis created ICQ (I Seek You) to meet the mushrooming needs of a growing Internet community who

"was" connected but not interconnected." The first Internet-based chat application rapidly ushered in a new category in the virtual world. The PIM arena has flourished with a variety of client chat tools, including MSN Messenger, Yahoo! Messenger, and AOL Instant Messenger (AIM). Prior research [10–16] have identified the key features of IM as follows: (1) presence awareness, (2) immediate closed loop communication, (3) multi-party collaboration, (4) anytime, anywhere access, (5) opportunistic interaction, (6) broadcasting of information or questions, (7) negotiation of availability for interaction, (8) within-medium polychromic communication, (9) "pop-up" recipient notification, (10) silent interactivity, and (11) ephemeral transcripts. These unique characteristics make IM a powerful new tool for business communication by means of revamping employee productivity and efficiency in the workplace, even though IM is somewhat similar to email and the telephone in terms of text-based communication and interactivity and intrusiveness, respectively.

Following the general definition suggested by Nardi et al. [5], this study defines EIM as "a near-synchronous computer-based interactive communication medium that facilitates and enhances business applications collaboration and presence information within corporations and between businesses." Unlike PIM, which is geared toward entertainment purposes, EIM is able to integrate into various business applications such as project management tools, document sharing/management applications, calendars, and desktop productivity applications. However, EIM must con- form to a higher standard in several critical areas, as follows [17].

- Secure: provides the means to control, limit access to, and protect vital communications and data transported through the network
- Stable: operates reliably regardless of the demands placed on it by the network environment or users
- Efficient: uses the minimum amount of system and network resources required without taking important resources away from other mission-critical

applications

- Feature Rich: offers an effective and useful feature set that has an impact on achieving mission-related objectives
- Compatible: does not require changes to existing systems to implement
- Scalable: meets the demands of a changing corporate environment
- Simple: is easily learned and effectively utilized by the intended users
- Cost-Effective: to deploy and maintain initially, and in the long-term

Efficient communications are integral to the success of any enterprise, especially in The electronic commerce era [18]. Today's business teams comprise colleagues, suppliers, partners, supporters, contractors, and customers who are dispersed across campuses, countries, and around the world. Furthermore, being keenly concerned with time sensitivity and speed in communications and getting the right information to the right people at the right time, business managers have discovered the strategic value of EIM, which aids in interacting with remote individuals in a flexible, efficient, and nearly instantaneous fashion. Simply put, the strategic value of EIM lies in the ability to accelerate decision processes and significantly lower the traditional communication cost because of its real-time nature. It is believed that the strategic value of EIM is the primary force driving enterprises to leverage EIM in the workplace in an effort to establish competitive advantages [19] by means of improved inter-organizational collaboration [2] because organizations that have implemented EIM as an instantaneous means of business communication are able to correspond more flexibly to their organizational constituents than their counterparties that merely depend on asynchronous technologies such as email and fax.

Due to its strategic value, EIM is now considered a possible enterprise-wide business requirement because employees could employ it for more flexible and efficient

ways of working, which might further lead to improved job satisfaction, reduced stress, enhanced productivity, and flexile and remote working. As such, organizations are interested in implementing EIM and understanding how their employees would adopt EIM in the workplace for better collaboration and communication as well as productivity. According to International Data Corporation (IDC) report [20], approximately 60%–70% of all enterprises regarded productivity improvements, collaboration, and best practices as the primary business drivers to adopt IM across their employees. IBM Vice President John Patrick reported that EIM has become a "mission-critical operation" and that IBM employees send over 1 million instant messages each day internally. A recent practitioner survey showed that EIM usage in businesses still continues to increase [9, 20], and industry sources agree that this worldwide community is increasing exponentially. Although the predictions of IM penetration in the workplace vary, most indicators suggest that EIM adoption will continue to grow pervasively toward ubiquity in the enterprise. For instance, IDC estimated that business users would account for nearly half of the 506 million users expected online by 2006 [20].

Capability for real-time communications is a distinct competitive advantage for Any enterprise. For employees, "Presence Information" about their contacts makes their communications targeted, efficient, cost effective, and secured. Consequently, EIM has become a core competency in which enterprises are willing to invest. As the current IM-related research is generally investigated with concentration on PIM- related issues, such as gender for college students [21, 22], workplace [11, 13, 14, 21, 23], teen life [4], and information security and monitoring [24, 25], there is little research focused on EIM adoption in the workplace. Therefore, this research endeavors to contribute to the IS community by employing a variety of theoretic lenses to understand the EIM adoption in enterprises.

THEORETICAL FRAMEWORK

Technology Acceptance Theories

Over the past several decades, numerous topics have been researched regarding the diffusion of innovations [26, 27], diffusion of new communication technology [28], and technology acceptance [29]. Among these, technology acceptance and adoption is specifically singled out for this research.

Technology adoption has been a well-researched area in the IS field. It consists of a variety of theories derived from other disciplines, including the Theory of Reasoned Action (TRA) [30] and the Theory of Planned Behavior (TPB) [31]. The Technology Acceptance Model (TAM) proposed by Davis [7] is a further adaptation of TRA specifically tailored for modeling user acceptance of information systems. TAM is a de facto milestone in user acceptance of technology research in the IS field. TRA suggests that social behavior is motivated by an individual's attitude toward carrying out specific behavior. However, it does not specify what specific beliefs would be important in a particular situation. TAM posits that an individual's behavioral intention to use an IT is determined by two beliefs: perceived usefulness (PU), defined as the extent to which a person believes that using an IT will enhance his or her job performance, and perceived ease of use (PEOU), defined as the degree to which a person believes that using an IT will be free of effort. TAM employs the well-established causal chain: beliefs→ attitude→ intention→ behavior [34]. The measurements tested and validated by other research targets not only employee acceptance but also various users, experienced and inexperienced, types of systems, word processing, spreadsheet, email, voicemail, gender, and electronic commerce.

Later, Venkatesh, and Davis [60] proposed TAM2, an extension of TAM. By Delineating uncovered external variables of PEOU and PU, TAM2 synthesizes the previous efforts and reflects the previous request for the model's elaboration on better comprehensiveness and rigor. TAM2 provides a concrete means to advance the multi-level model because it identifies and theorizes about the general determinants of PU, such as

social influence (subjective norms) and cognitive instruments (job relevance, image, output quality, and result demonstrability), and two moderators, including experience and voluntariness. TAM2 introduces two theoretical processes, social influence and cognitive instrumental processes, to explain the effects of the various determinants on PU and behavioral intention. Attempting to validate TAM2 in different IT artifacts, Venkatesh and Davis found strong support for TAM2 in longitudinal field studies at four organizations. Based on TAM2, a number of researchers further modified the TAM2 and extended its applications to other areas. The Unified Theory of Acceptance and Use of Technology model (UTAUT) proposed by Venkatesh et al. [32] is one of the emerging examples. Yet, it is not clear how external variables would affect the usage behavior and intentions in different contexts. It is hoped that further research would provide better understanding of the factors that influence acceptance of new technologies like EIM in the workplace.

Motivation: Enjoyment and Playfulness

According to Davis et al. [33], enjoyment refers "to the extent to which the activity of using a computer system is perceived to be personally enjoyable in its own right aside from the instrumental value of the technology." Based on TAM2, van der Heijden [34] studied the differences in user acceptance model for productivity-oriented (utilitarian) and pleasure-oriented (hedonic) information systems. His findings support that Perceived Ease of Use and Perceived Enjoyment are stronger determinants of Intention to Use than Perceived Usefulness for pleasure-oriented information systems. The author defined Perceived Enjoyment as "the extent to which fun can be derived from using the system."

The importance of his investigation is that the hedonic nature of the information systems is a boundary condition to the validity of the TAM2 because Perceived Usefulness loses its dominant predicative value in favor of Perceived Ease of Use and Perceived Enjoyment.

In the field of IM research, Li et al. [6] performed an empirical investigation and concluded that IM is a useful and fun tool and that enjoyment is the dominant factor

explaining grassroots adoption of communication technologies. Both Perceived Enjoyment and Perceived Playfulness are classified as a type of intrinsic motivation. Moon and Kim [35] defined Perceived Playfulness as "the extent to which the individual perceives that his or her attention is focused on the interaction with the information technology; is curious during the interaction; and finds the interaction intrinsically enjoyable or interesting." Lin et al. [36] suggested that Perceived Playfulness also contributes significantly to the user's intent to use/reuse a website. This finding is in line with [12], [37], and [22] in that Perceived Playfulness is an important factor to motivate users to utilize a system and is significant with regard to behavioral intention to adopt technologies. It is concluded that intrinsic motivational factors are important for developers to design user interface for better adoption and usability.

Innovation Diffusion Theory

Rogers' Innovation Diffusion Theory (IDT) [26] is yet another prevalent model that has been used in IS research to explain user adoption of new technologies. In the domain of adoption process, innovation and diffusion have been extensively researched and are "perhaps one of the most widely researched and best documented social phenomena" [38]. In Innovation Diffusion (ID) research, IDT is the most acceptable and reliable framework that has been fairly widely validated in sociology, psychology, and communications as well as IS to explain user adoption of technical innovations. According to Rogers, innovation is "an idea perceived as new by the individual" and diffusion is "the process by which an innovation spreads." As a consequence, diffusion processes result in the acceptance or penetration of a new idea, behavior, or physical innovation.

To make an innovation successful, Rogers' IDT identified five critical characteristics: relative advantage, compatibility, complexity, communicability, and trialability. Further, Moore and Benbasat [39] expanded IDT by proposing Perceived Characteristics of Innovating (PCI) in which three additional constructs, including voluntariness, image, and result demonstrability, were identified for ID research. Venkatesh et al. [32] suggested

that relative advantage is equivalent to PU and that complexity is equivalent to PEOU of TAM/TAM2. Further, according to Carter and Belanger [40] and Tornatzky and Klein [41], relative advantage (PU), compatibility, and complexity (PEOU) are the most relevant constructs for adoption research. Also, voluntariness and trialability are excluded in this research because they would be unlikely to show significant variability in the mandated enterprise context. Therefore, compatibility and image are employed for this study. Because EIM is an innovative technology to be evaluated and implemented by companies, IDT is used as a part of theoretical foundation to predict the adoption of EIM.

Theory of Critical Mass

Oliver et al. [42] proposed the Theory of Critical Mass in social science, indicating that a small segment of the population chooses to make big contributions to the collective action. When applied in the IS area, the success of a communication technology is not only reliant on an individual's use of the technology but on others' responses to this use. Further, Markus [28] explained that after a certain number or proportions of users have been attracted, use should spread rapidly throughout the community. Li et al. [6] argued that the benefit of using a communication technology, such as IM, cannot be achieved by an individual if his or her communication partners do not use the technology. This is congruent with Lou et al. [43] in that IS acceptance requires the participation of many individuals to create a sense of collective action and few people are willing to use technology on their own or in small numbers. This indicates that the use of technology will decline if critical mass is absent. Therefore, for EIM adoption, which connects all of the involved constituents to communicate, critical mass is of crucial importance and is believed to contribute to the technology acceptance paradigm.

Research Questions

Over the past decade, there has been a growing recognition that adoption and extensive diffusion of new technologies and technological innovations are critical for

individuals to have meaningful engagements in an information society. As such, the adoption and diffusion of new technologies and innovations research literature is voluminous and has identified a number of important factors associated with adoption and diffusion across multiple levels. Amid these prior studies, TAM offers a parsimonious theoretical underpinning to predict acceptance of a new innovation at an individual level and to explain why potential users embrace or reject a specific technology under a variety of circumstances. With its validated rigor, TAM has been used to examine studies related to technologies including email, voicemail, spreadsheets, word processors, database programs, and the Internet. By employing TAM as the theoretical foundation and incorporating additional cognitive psychological and innovative technology specific variables into it, we present an empirical study of EIM adoption attempting to provide answers to the main research question: "What are the factors leading to the adoption of EIM?" Specifically, in an effort to further advance the literature of technology acceptance in the area of business communication technology amid individual employees, we address the following research questions:

RQ1: Is the adoption of EIM driven by similar factors that drive the adoption of other information technologies?

RQ2: What are the important factors in EIM adoption?

RESEARCH MODEL AND HYPOTHESES

Recent research, such as Li et al. [6], Wang et al. [44], Zhou [45], Zhou and Zhuang [46], Lin et al. [47], Baron [48], and Cameron and Webster [21], all suggested that IM is useful, especially for coordination and organization of impromptu social meetings, even though IM is perceived to be much less rich than face-to-face communication. While the previous research intended to predict general IM adoption among college students, teenagers, and Web surfers, the focus of this study is to investigate business users' intention to adopt EIM to support complex work discussions between

different constituents. Since TAM and IDT have been previously validated for technology and innovation acceptance, this study integrates the key factors of these theories, along with motivational factors including enjoyment and playfulness. Further, this study draws on the theory of critical mass, security, and risk issues. The proposed integrative research model is shown in Figure 1.

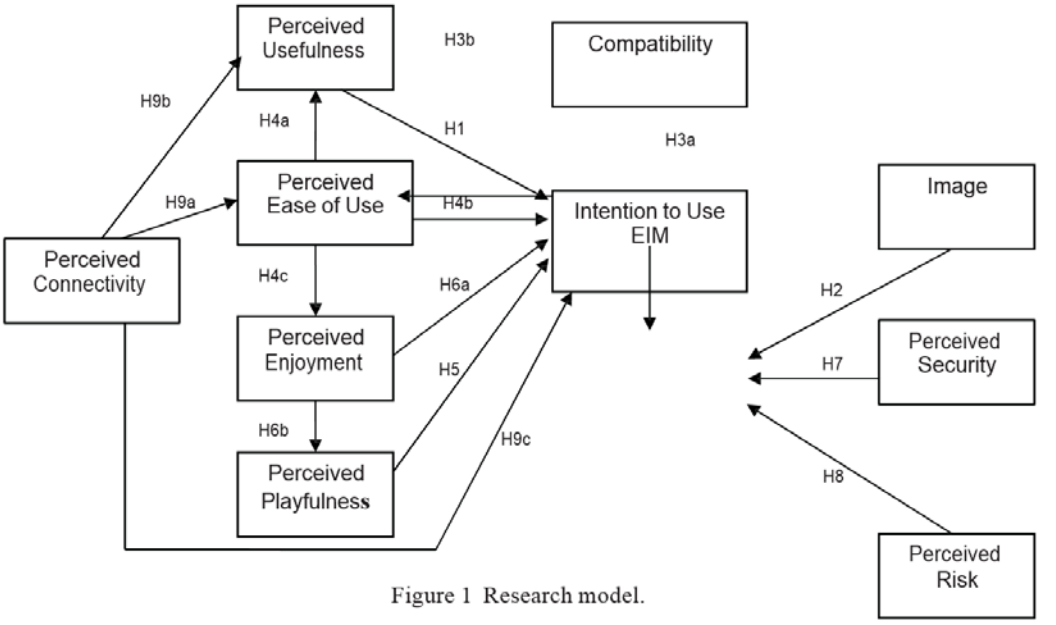

Figure 1 Research model.

Perceived Usefulness

Defined by Davis as “the degree to which a person believes that using a particular system would enhance his or her job performance” [7], PU is a measure of the individual’s subjective assessment of the utility offered by the new IT in a specific task-related context [49]. Usefulness is a very general perception about the efficiency of the communication technology in providing instant feedback, conveying multiple cues, and expressing feelings and emotions, regardless of the conditions of communication tasks [6]. In accordance with the original TAM model and previous TAM studies, the first hypothesis assumes that the relationships between PU and the dependent variable will apply to other technological phenomena. In essence, the evidence from TAM-related and its extended studies indicate that the higher degree of perceived usefulness of a system, the stronger the intention for

users to utilize. Viewing EIM as a new technology, we expect that when employees believe that using the EIM application will enhance their working productivity and communication efficiency they will be more likely to adopt this technology. Based on this contention, the first hypothesis is:

H1: Perceived Usefulness is positively associated with Intention to Use EIM.

Image

Image is extracted from PCI and is defined as the degree to which use of an innovation is perceived to enhance one's image or status in one's social system. According to Rogers [26], for any individual to adopt an innovation, the desire to gain social status is one of the most important motivations. As such, Moore and Benbasat [39] suggested that social approval or image signifies the extent to which a user believes an innovation will add social prestige or status. A delve into literature finds that image plays a role among peer group attitudes and actions among individuals [50]. Prior research states that interpersonal environments that mediate institutional-level peer group effects are strongly supported by the role of image, which underscores a need for researchers and administrators to better understand socialization in different settings [50]. This postulation is based on evidence that points to the fact that image is important to individuals in socialization. Specific to this study, it is believed that employees will experience a greater likelihood to choose and use EIM, as set forth in the following hypothesis:

H2: Image is positively associated with Intention to Use EIM.

Compatibility

Compatibility is defined as the degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters. Recent research by Kaefer and Bendoly [51] found compatibility significant in the diffusion

of electronic data interchange (EDI). Hardgrave et al. [52] found compatibility significant for adoption of systems development methodology. In addition, Parthasarathy and Bhattacherjee [53] found that a lack of compatibility can lead to discontinuance of a previously adopted technology. A potential adopter of an innovation is likely to want that innovation to be compatible with other innovations currently in use. This relates to the issue of relevance of technology and interoperability as well as integration, in terms of the open standard, of the EIM environment with mainline business and business applications. Therefore, we hypothesize that:

H3a: Compatibility is positively associated with Intention to Use EIM.

H3b: Compatibility is positively associated with Perceived Usefulness.

Perceived Ease of Use

In TAM studies, perceived ease of use (PEOU) refers to "the degree to which a person believes that using a particular system would be free from effort" [7]. PEOU is an indicator of the cognitive effort needed to learn and to utilize the new IT [49]. According to Davis [7], Davis et al. [29], and Venkatesh et al. [32], PU is considered a significant predicator of ITU, and PEOU is thought to exert a significant influence on PU. Both PU and PEOU influence an individual's ITU toward the use of a new technology and/or system. These two factors are thereby believed to be predictive in this model. Moreover, van der Heijden [34] indicated that PEOU and perceived enjoyment are stronger predictors of ITU in a hedonic IS than PU and concluded that hedonic nature of an IS is an important boundary condition to the validity of the TAM. In addition, Bruner and Kumar [54] suggested an important way to increase fun is to increase ease of use. This study therefore hypothesizes that:

H4a: Perceived Ease of Use is positively associated with Perceived Usefulness.

H4b: Perceived Ease of Use is positively associated with Intention to Use EIM.

H4c: Perceived Ease of Use is positively associated with Perceived Enjoyment.

Playfulness

Playfulness is an inseparable part of one's use of communication technology in the organizational context. Moon and Kim [35] suggested that people use the technology (e.g., Internet) not only for utilitarian purposes but also for hedonism. From the theory of flow, they argued that playfulness is an intrinsic belief or motive and introduced it into the original TAM model. Perceived playfulness was found as a significant predictor of ITU in previous research including Lin et al. [36], Allen [55], Chung and Tan [37], and Chen et al. [56]. Thus, we hypothesize that:

H5: Perceived Playfulness is positively associated with Intention to Use EIM.

Enjoyment

While Li et al. [6] defined that perceived enjoyment is "the perception of the fun, enjoyment, and pleasure inherent in using communication technology to keep and develop interpersonal relationships," Davis et al. [29] found that enjoyment is a significant determinant of behavioral intention. Perceived enjoyment as an intrinsic motivation has been found to have a significant impact on a user's technology acceptance, especially for hedonic systems [33, 34]. Users will be intrinsically motivated to adopt a technology when it can bring fun and pleasure. This further implies that EIM can facilitate communications across different business constituents that might be beyond the physical business boundary. However, such spanning across boundaries of the business might blur the conceptual distinction between utilitarian and hedonic systems. As noted above, IM often has rich entertainment functions and users can obtain great enjoyment while using it. Thus we expect that perceived enjoyment will improve their affective attitude toward IM and promote their intention of accepting IM.

H6a: Perceived Enjoyment is positively associated with Intention to Use EIM.

H6b: Perceived Enjoyment is positively associated with Perceived Playfulness.

Risk and Security

Despite the technological advancement, EIM users might be concerned about risk and security issues. Perceived risk refers to the extent to which a functional or psycho-social risk a user feels he/she is taking when using a product. As defined by Sumner [76], perceived risk is an assessment of the possibility of an event taking place that may impact the achievement of his objectives. Such events that may increase the risk of users may be the fear of misuse of information by the information receivers or failure to safeguard information by the information receivers. Therefore, the perceived risk will greatly affect a user's intention to use a particular product/service. In our paper, the perceived risk pertains to the probability that the transmitted information may be compromised by the information receiver. Rather than the risk with the technology, we are theorizing the perceived risk as risk related to information use. When the perceived risk is high the user may not be willing to use EIM. For sensitive information the user may prefer to choose other modes of communication such as face-to-face.

Users' perception of unsatisfactory security on the Internet is one of the primary reasons hindering online use. Perceived security refers to the subjective probability with which users believe their sensitive information (business or private) will not be viewed, stored, and manipulated during work sessions by unauthorized parties in a manner consistent with their confident expectations. In the arena of EIM, security is referred to employees' perception regarding the reliability of the communication channel used and the mechanisms of data transmission and storage. Due to the instantaneous transmission nature of IM, there is a concern for the data confidentiality and integrity in the organization because employees use IM to communicate with their constituents, some of which are beyond the organizational boundary (i.e., remote colleagues). As such, we posit that employees are more inclined to accept EIM if they can perceive security mechanisms implemented in the organization to safeguard the communication channel. In the same vein, employees might be hesitant to use or might even reject EIM if they surmise that

both internal and external security threats might imperil their working. We contend that perceived security is a different construct than perceived risk, as perceived security is related to technology whereas perceived risk is related to information.

The relationships of perceived risk and perceived security with adoption are reversed: the more risks perceived by users, the less likely users are to adopt EIM systems; the better security perceived by users, the more likely users are to adopt EIM systems. Because other research have found that perceived risk and perceived security are related to intention to use technology such as mobile commerce and online transactions [57, 58], the following hypotheses are proposed:

H7: Perceived Security is positively associated with Intention to Use EIM.

H8: Perceived Risk is negatively associated with Intention to Use EIM.

Perceived Connectivity

Oliver et al. [42] suggested that some threshold of participants or actions has to be crossed before a social movement explodes into being. This contention implies that critical mass is the basis for producing collective actions [43]. Prior studies suggested that theories in social psychology, economics, and diffusion of innovations all support that critical mass, by means of increasing interconnections amid users, is important for individual choices and actions [6, 28, 43]. For instance, the economics literature indicates that due to the effects of network externality a user will benefit more from a technology as the total number of users for this technology increases [59]. From the perspective of EIM, perceived connectivity in terms of the cognitive number of users interacting in the same technological context could explain the electronic communication of an individual with other involved parties. Previous research indicated that the technology acceptance would increase if the number of technology users increase [6, 21, 44]. Thus, employees will be more likely to use the technology if their intended message recipients are also using it on a routine basis. Consequently, the EIM system's features and functionalities can be understood by this connected interaction,

which may further influence and develop user's perception toward PEOU and PU of the EIM system. Thus, if an individual EIM user perceives that other connected parties are also using the EIM system, he or she will be more likely to accept the technology; then he or she may perceive that using EIM is not difficult and complicated because demonstrations, experiences, or suggestions are readily available through the instantaneous interactions. Based on these theoretical supports, the following hypotheses are proposed:

H9a: Perceived connectivity is positively associated with Perceived Ease of Use.

H9b: Perceived connectivity is positively associated with Perceived Usefulness.

H9c: Perceived connectivity is positively associated with Intention to Use EIM.

METHODOLOGY

Instrument Development and Data Collection

The proposed hypotheses in this study were tested using a survey methodology. A questionnaire survey was formulated on a basis of literature survey. TAM-related instrument items were derived from multiple-item perceptual scales from Davis [7] and Venkatesh and Davis [60]. All responses were measured along a Likert 5-point scale where 1=strongly disagree and 5=strongly agree, because a Likert scale is a psychometric scale commonly and the most widely used scale in survey research. Although the items were derived from well-validated research, several doctoral students as well as faculty members who have experience dealing with research in the field of information systems were contacted to provide feedbacks on the instrument. Required modifications were made based on their responses and comments. A pilot study was conducted with undergraduate students who have experience with instant messaging at a southern university in the United States. After further refinement, the final instrument was prepared for the survey. The final survey items are shown in Appendix B.

A total of approximately 400 subjects were invited to complete this survey across several companies of different industries, including finance, insurance, and consulting

firms, etc. Subjects were informed that this is an investigation on business enterprise instant messaging adoption and that their responses would remain anonymous. Their participation was completely voluntary and those who did not want to participate could leave or refuse to complete the survey. Among those contacted, 287 started, but only 140 completed the survey. The profile of the respondents is given in Table 1.

DATA ANALYSIS AND RESULTS

To test the proposed hypotheses, we used Partial Least Squares (PLS) 3.0. PLS requires The sample size to be at least ten times of the larger number of paths going to an endogenous construct, when all constructs are reflective [61, 62]. In addition, PLS is well-suited for studies in the early stage of theory building and testing [63].

Table 1 Demographics of the respondents.

Demographics	
Position Levels	Percentage
Top management (VP, President, etc.)	1.4%
Middle management (Department Head, Project Manager, Team Leader, etc.)	21.4%
IT management (Network Manager, Administrator etc.)	24.3%
Staff (Analyst, User Support, Programmer, Secretary, etc.)	52.9%
Gender	
Male	61.4%
Female	38.6%
Age Distribution	
Under 20	2.9%
Between 20 and 24	2.9%
Between 25 and 29	17.1%
Between 30 and 34	40.0%
Between 35 and 39	20.0%
Between 40 and 44	8.6%
Between 45 and 49	5.7%
Above 50	2.9%

Measurement Model

The measurement model was validated by assessing the internal consistency and convergent and discriminant validity [64]. The internal consistency of a scale is known to be adequate if its composite reliability (CR) is above .7 and the average variance extracted (AVE) is above .5 [65]. As shown in Table 2, all the measures have demonstrated composite reliabilities and average variance extracted exceed the required levels thus

establishing adequate internal consistency. The convergent validity is achieved when each item correlate with its theoretical construct. As shown in Table 2, all indicators exceed the level of .6 as suggested by Bagozzi and Yi [65], thus establishing adequate convergent validity. The discriminant validity infers each item correlate weakly with all the constructs besides its theoretically related construct. As shown in Table 3, the square root of average variance extracted for each construct is higher than the inter-construct correlation, thus suggesting adequate discriminant validity.

Table 2 Item loadings, composite reliabilities and average variance extracted.

Construct	Item	Loadings	CR	AVE
Perceived Connectivity	PCON1	.948	.944	.808
	PCON2	.901		
	PCON3	.927		
	PCON4	.812		
Perceived Usefulness	PU1	.695	.929	.726
	PU2	.849		
	PU3	.914		
	PU4	.921		
	PU5	.863		
Perceived Ease of Use	PEOU1	.841	.839	.635
	PEOU2	.714		
	PEOU3	.831		
Perceived Enjoyment	ENJ1	.889	.910	.718
	ENJ2	.824		
	ENJ3	.763		
	ENJ4	.907		
Perceived Playfulness	PLFL1	.950	.957	.917
	PLFL2	.965		
Compatibility	COMP1	.877	.862	.682
	COMP2	.633		
	COMP3	.935		
Intention to Use EIM	ITU1	.754	.917	.736
	ITU2	.899		
	ITU3	.886		
	ITU4	.885		
Image	IMG1	.925	.919	.850
	IMG2	.918		
Perceived Security	SEC1	.979	.981	.963
	SEC2	.984		
Perceived Risk	RSK1	.909	.917	.847
	RSK2	.932		

Table 3 Correlation matrix, mean, standard deviations and the square root of average variance extracted.

Constructs	Mean	SD	PCON	PU	PEOU	ENJ	PLFL	COMP	INT	IMG	SEC	RSK
PCON	4.042	1.054	.899									
PU	3.943	.943	.507	.852								
PEOU	4.091	.688	.398	.612	.797							
ENJ	4.303	.839	.298	.516	.454	.847						
PLFL	3.725	.871	.256	.531	.383	.696	.958					
COMP	4.230	.824	.377	.619	.447	.599	.673	.826				
INT	3.633	.970	.408	.632	.427	.559	.526	.732	.858			
IMG	2.447	.932	.227	.281	.254	.356	.287	.352	.363	.922		
SEC	3.072	1.057	.174	.274	.133	.315	.369	.413	.389	.212	.981	
RSK	2.365	.995	-.192	-.359	-.229	-.373	-.382	-.418	-.316	-.107	-.574	.920

Note: The square root of average variance extracted (AVE) are shown on diagonals; SD = standard deviation; CR = composite reliability; PCON = perceived connectivity; PU = perceived usefulness; PEOU= perceived ease of use; ENJ = perceived enjoyment; PLFL = perceived playfulness; COMP = compatibility; INT= intention to use enterprise instant messaging; IMG = image; SEC = perceived security; and RSK = perceived risk.

Common Method Variance

There may be a potential for common method variance (CMV) because the self-reported data is susceptible due to consistency motif, common rater effects, and social desirability [66]. First, we conducted Harman's single factor test [67] to see if a single factor will emerge exploratory factory analysis. As more than one factor emerged there is high probability that common method variance is not a significant problem with the data. Second, we conducted a test controlling for the effects of an unmeasured latent methods factor [66]. The results of this test, as shown in Appendix A, have only 4 out of 31 paths from unmeasured latent factor to single-indicator constructs that are significant. The average substantively explained variance of the indicators is .766 while the average method based variance is .020. The ratio of substantive variance to method variance is about 37:1. Considering the low number of significant paths and low ratio, we have no reason to doubt that common method variance may be an issue in this study.

Structural Model

After determining the validity of the measures, we tested the structural model through estimates of the path coefficients, coefficient of determination (R2) values. The

proposed hypotheses were tested using two tailed t-tests. The significance of individual paths is shown in Figure 2 and is summarized in Table 4. Ten out of 15 paths exhibited a p-value less than .05. The R2 value shows that 62% of the variance in intention to use EIM was explained by perceived usefulness, perceived ease of use, compatibility, enjoyment, and security factors. Furthermore, the 58% of the variance in perceived usefulness, 16% in perceived ease of use, 21% in enjoyment, and 48% in playfulness were accounted.

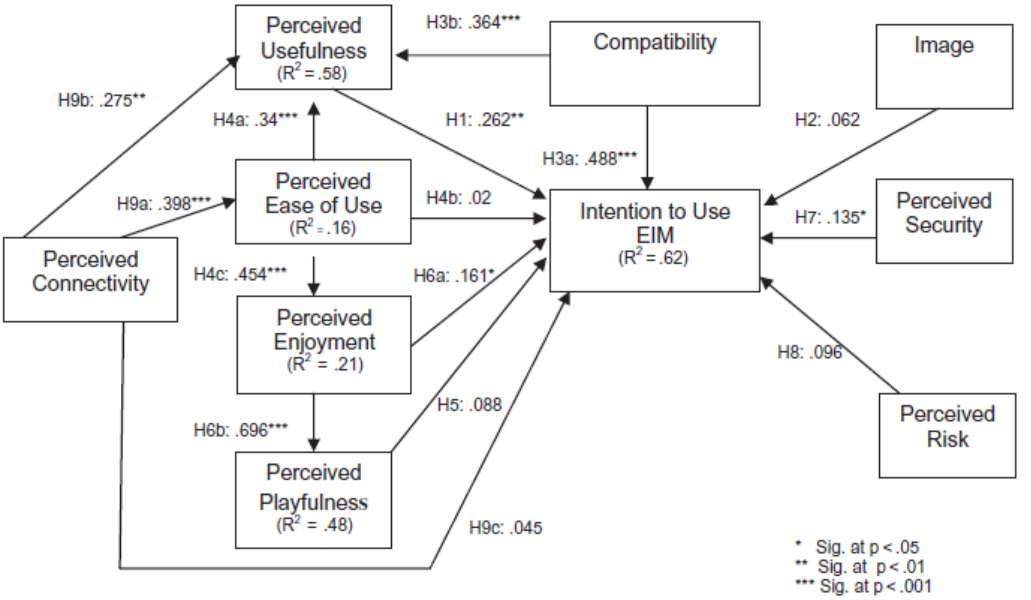

Figure 2 Results of the Analysis

Table 4 Results of hypothesis testing.

Hypotheses	Results
H1: Perceived Usefulness is positively associated with Intention to Use EIM	Supported
H2: Image is positively associated with Intention to Use EIM	Not Supported
H3a: Compatibility is positively associated with Intention to Use EIM	Supported
H3b: Compatibility is positively associated with Perceived Usefulness	Supported
H4a: Perceived Ease of Use is positively associated with Perceived Usefulness	Supported
H4b: Perceived Ease of Use is positively associated with Intention to Use EIM	Not Supported
H4c: Perceived Ease of Use is positively associated with Perceived Enjoyment	Supported
H5: Perceived Playfulness is positively associated with Intention to Use EIM	Not Supported
H6a: Perceived Enjoyment is positively associated with Intention to Use EIM	Supported
H6b: Perceived Enjoyment is positively associated with Perceived Playfulness	Supported
H7: Perceived Security is positively associated with Intention to Use EIM	Supported
H8: Perceived Risk is negatively associated with Intention to Use EIM	Not Supported
H9a: Perceived connectivity is positively associated with Perceived Ease of Use	Supported
H9b: Perceived connectivity is positively associated with Perceived Usefulness	Supported
H9c: Perceived connectivity is positively associated with Intention to Use EIM	Not Supported

DISCUSSION

This study aims to shed light on the critical antecedents of employees' intention to use enterprise instant messaging. One general research question drove this study: What are the factors leading to the adoption of EIM? This study answered this question by examining five aspects of this decision, i.e., technology acceptance, technology diffusion, cognitive psychology, critical mass, and security and risk. Overall, our research model demonstrates a good fit with the data collected from industry because the overall explanatory power of our research model has an R-square of 62% for the intention to use EIM. Several insightful results could be summarized from our research framework, as follows.

To investigate whether the adoption of EIM is driven by the same factors as other information technologies, we analyzed the links between our research variables and found that 10 out of the 15 causal links specified by the model are supported (see Table 3). The results of the empirical study indicate that perceived usefulness (H1, b=.262), compatibility (H3a, b=.488), enjoyment (H6a, b=.161), and security (H7, b=.135) are important predictors of intention to use EIM. Each individual finding is consistent with previous research findings in the arena of technology acceptance [6, 49, 68].

These salient constructs explain 62% of the variance in individual user's behavioral intention to use EIM, suggesting that the proposed research model is capable of explaining a relatively high proportion of variation of intention to use EIM. In line with previous IS adoption research, the significant relationship between perceived usefulness and intention to use EIM implies that if employees feel that EIM is useful, they will be willing to accept and use this technology. Among the predictors for

intention, compatibility appears most prominent (b = .488). This interesting finding implies that the compatibility of one's working style seems to be a significant predictor for intention to use EIM in the workplace.

Prior research [32, 60] indicated that perceived usefulness, instead of compatibility, is the strongest predictor of intention among TAM-related variables for productivity-oriented systems. In addition to this intriguing discovery, we found that perceived usefulness mediates several indirect relationships, such as perceived connectivity and behavioral intention to use EIM, perceived ease of use and behavioral intention to use EIM, and compatibility and behavioral intention to use EIM. In essence, perceived ease of use, compatibility, and perceived connectivity explain 58% of the variance in perceived usefulness. This finding, again, confirms that the TAM construct is an important predict-or of technology acceptance/adoption, as in many past studies. As perceived ease of use (H4a, b = .340) and perceived connectivity (H9b, b = .275) are significant predictors of perceived usefulness, this study also found that perceived connectivity is related to perceived ease of use. A possible explanation of this finding may be the following: a large number of user bases would encourage more participation in EIM use since the value of network would increase for the participants as they could communicate with more organizational constituents. Having more participants in EIM makes it easier for users as they could learn from others or have more opportunities to ask for assistance and/or collaboration in an instantaneous manner. Consistent with previous TAM studies, perceived ease of use is significant with perceived usefulness [6, 32, 49]. This indicates that if employees find that EIM is easy to use, they will be

willing to use it in order to improve the quality of their work through instantaneous correspondence and coordination in the workplace. For practitioners, driving the connectivity of EIM will help to improve its usefulness and further growth in EIM use.

As hypothesized, perceived ease of use predicts perceived enjoyment (H4c, b=.454) and perceived enjoyment predicts both perceived playfulness (H6b, b = .696) and intention (H6a, b = .161). This is consistent with previous research [33] in terms of the relationship between affective reactions and cognitive reactions for technology acceptance. Because of ease of use, using EIM can be an enjoyable experience for users. Users may derive intrinsic motivation to use the EIM due to its enjoyable nature. In addition to usefulness, which is intrinsic motivation, enjoyment can also help to predict the use of system [34]. This finding, which is consistent with those from [69], suggests that use of EIM in organizations may be driven by intrinsic motivation of the users, which, thereby, can make the general acceptance much easier.

Most of the results confirmed the hypothesized relationships between constructs as consistent with prior research. However, this research study did not find support for the effect of perceived ease of use on behavioral intention to use EIM (H4b, b = .020). The insignificant path coefficient suggests that this unexpected, yet interesting, finding is different from many prior studies that employed TAM (i.e., email, spreadsheet, voicemail). Revisiting the literature of TAM, we found that the role of perceived ease of use in technology acceptance has been mixed. There are several studies that did not find the significance of perceived ease of use in technology use [70–72]. Gefen and Straub [73] theorized that the effect of perceived ease of use on intention would be affected by the nature of the task. Literature suggests that for experienced users,

perceived ease of use may not apply for techno-logy acceptance [73, 74]. Because IM for pleasure is a fairly common practice, we conjecture that such experience would exert some effects on the use of EIM. As a result, ease of use would not be a significant predictor for EIM acceptance. The path analysis indicates that perceived ease of use influences behavioral intention indirectly through perceived usefulness and perceived enjoyment. One possible explanation for this inconsistency stems from the unique technological nature of EIM, near-synchronous interactions that facilitate business collaborations and communications. Without perceived usefulness and perceived enjoyment, employees are not willing to use EIM regardless of a user-friendly interface and simple application setting of EIM. As such, we believe that future studies are needed to resolve this inconsistency in different technological phenomena. Particularly, such factors as task characteristics, gender, and culture are encouraged to help researchers to better fathom this erratic contingency.

Furthermore, contrary to what we hypothesized, perceived connectivity did not have significant direct effect on behavioral intention to use EIM (H9c, b = .045). The absence of a direct significant impact of perceived connectivity on behavioral intention indicates that a user's decision to use EIM is not directly influenced by whether the same technology is used by peers in the organization. This finding is inconsistent with previous studies in diffusion of innovation research in which personal interactions are regarded as an important source of external influence for technology adoption [6, 26, 43]. Yet perceived usefulness mediates the relationship between perceived connectivity and behavioral intention, suggesting perceived connectivity is a more direct predictor of perceived usefulness than intention. We further surmise that a subjective norm, which was excluded in TAM due to its theoretical ambiguity and psychometric un-

certainty [29], may have influence on the relationship between perceived connectivity and behavioral intention. As such, more research is needed to explore the effect of social norm (i.e., moderator or mediator) on EIM acceptance.

Finally, we conducted a post-hoc analysis to determine if it is possible to have a more parsimonious model by removing insignificant paths in our proposed model. The variance in the dependent variable slightly decreased to .60 from .62, with a model having only perceived usefulness, enjoyment, compatibility, and perceived security as predictors of intention. Although playfulness was not significant in the proposed model, removing it from the model also affected other paths to become insignificant. Therefore, even though playfulness had an insignificant relationship with the intention, playfulness may have affected the intention indirectly through enjoyment. Another post-hoc analysis that we conducted to determine if image, perceived security, and perceived risk would be related to perceived usefulness for mediating relationship showed that such relationships were not supported by data.

IMPLICATIONS

How is EIM different from other IT artifacts in terms of user adoption in organizations? Given the rise of end-user influence in IT decision making and increasing employee-driven demand for more efficient and flexible ways of work in organizations, this has become a paramount subject. Drawing on conceptualization in information systems and cognitive psychology, this study presents one possible manner in which perceived connectivity, derived from the theory of critical mass, manifests at the individual level of analysis and impacts individual behavior. The study offers a series of hypotheses of how technology diffusion, cognitive psychology, critical mass,

and security and risk influence the constructs and relationships of an extended model of technology acceptance.

Our findings have important implications for future technology adoption research. This is one of the first studies in the technology adoption literature that explores individual-driven innovative group-ware technology (i.e., EIM) and proposes perceived connectivity, perceived security, and perceived risk as additional predictors of EIM adoption. Given the empirical support for our model, this research contributes to the literature in several important ways. First, understanding the commercialized IM use is a step in the direction advocated by Li et al. [6], who called for further studies of IM use. This study attempted to respond to the paucity of IM research in organizational settings. In essence, a contribution of this study is the introduction of perceived connectivity as a means of addressing the mediating roles of perceived usefulness between the needed critical mass and behavioral intention for IM acceptance in the workplace. For an individual-driven innovative groupware technology to reach its ultimate diffusion across various organizational sections, we believe that the predictive and explanatory power of future studies in information systems examining individual level phenomena would greatly benefit from a similar approach.

A second contribution of this study is that we found empirical evidence that compatibility is the strongest predictor in EIM adoption, even stronger than perceived usefulness, which is the most important predictor in technology acceptance research. This work extends prior research that has studied the dominant role of perceived usefulness. In other words, our work suggests that the compatibility of one's working style seems to be an extremely significant predictor for intention to use EIM in the workplace. The results further showed that compatibility is related with perceived

usefulness. Therefore, the compatibility not only impacts intention directly but also indirectly through perceived usefulness. Obviously, in situations where using EIM would hinder job responsibilities, employees would be discouraged to use EIM. The likelihood of using EIM may also be due to the fact that it encourages collaboration and work productivity. However, finding the link between use of EIM and productivity is beyond the scope of this study and will be a worth-while pursuit for future research.

Third, our research extends the recent stream of research on the impact of individual's security concerns on technology acceptance. Our study revealed that perceived security affects users' intention to adopt EIM in the workplace. This positive impact of perceived security on behavioral intention may be attributed to the fact that an individual employee who experiences, witnesses, and recognizes technological security mechanisms implemented in the organization (e.g., passwords for EIM logins, anti-virus applications, firewall, intrusion detection/prevention system) may develop a higher level of intrinsic technological security, which can better safeguard the communication channel between the individual employee and his or her EIM receivers. Regardless, this study detected no significant influence from perceived risk to behavioral intention. This intriguing theoretical finding departs from prior studies [77] that posited that perceived risk negatively relates to behavioral intention. As this study focuses on the functional and psychological risks associated with EIM use, we believe that our study contributes to the literature in that it further demonstrates the importance of using more comprehensive, clear, consistent conceptualization of perceived risk in IS research to better capture the relationship between risk and intention in technology adoption studies. We expect that additional dimensions of risk perception may aid IS researchers in further understanding the influence of perceived risk on behavioral

intention toward innovative technology acceptance.

Our work has important implications for practitioners as well. For practitioners, it is important for managers to understand and predict employees' EIM behaviors and to realize that use of EIM would be an avenue to foster collaboration among workers as long as it is compatible with the job responsibili- ties of the workers. Managers should exercise caution in implementing EIM in the workplace. From a managerial perspective, managers are responsible for ensuring a technologically secure EIM environment for their employees to transmit business-related IM messages over the organizational networks, as perceived security is a significant factor for EIM acceptance. For managers this means that effective security practices have to be devised and enforced, in addition to various technological mechanisms safeguarding the employees' computing systems and EIM applications. The employees must feel fairly secure and confident about the EIM technologies and platforms to ensure proper and continued use.

Furthermore, the significance of compatibility may avail managers to contemplate a revamped workplace and job design for employees who would opt for EIM acceptance. In essence, managers are advised that consideration be given, wherever needed and possible, to the mobility and communication channels for job performance when designing an employee's job. In a mobile environment, the employees would be motivated to interact with others through electronic media like EIM because it would not be possible to meet the colleagues face to face on a regular basis. The workplace design suiting the needs of employees would have a direct and positive impact on individual-driven EIM adoption in the workplace. In the same vein, one may be more likely to use EIM if he or she feels comfortable knowing that no one is interfering with his work (i.e., looking over his shoulders to read what he is typing on

screen). Therefore, the pragmatic implication for compatibility, in terms of both the job design and workplace design, will have a significant impact on the potential use of EIM by employees.

LIMITATION AND FUTURE RESEARCH

In addressing the research questions, the study has raised several issues that provide fruitful avenues for future research. Even if the quantitative data can fit the proposed model and our findings are encouraging, there are still other possible models to better explain the technology acceptance because there is no perfect research and different strategies carry comparative strengths and weaknesses. This research is no exception as it suffers from several theoretical and methodological limitations.

The UTAUT proposed by Venkatesh et al. [32] would be a possible avenue to further explain the EIM adoption in the workplace. Additionally, this investigation is pure quantitative research and it, thus, relies on survey and quantitative data. As such, there is a corresponding loss of generalizability and realism. To better explain or even find the key factors influencing the adoption of EIM, qualitative research methods, such as interview and observation, could be used to support the findings of this investigation. Also, the targeted companies are another limitation because they cannot stand for the whole business segment, therefore failing to reflect the perceptions of people in other social or business contexts. Future research should be able to expand the spectrum of research subjects by eyeing different business contexts and by incorporating additional factors that have yet to be tested by previous TAM-related research, such as gender and experience, as well as productivity measurement issues. In addition, this study has recognized the rise of end-user influence in IT decision making, but surmised that the implementation of EIM in the workplace is triggered by

the managers' decision. Thus, the study was under the assumption that the use of EIM by employees is manipulated by the managers responding to the end-user demand. Therefore, individual-level voluntariness was not incorporated in the research model due to the nature of the underlying postulation. We, however, conceive that the effect of voluntariness might exert a positive influence on individual decision making for innovative communication technology acceptance as employees become more empowered and knowledgeable with communication technology in the organization. In this manner, we encourage future research to further explore both voluntary and mandatory situations where the decision-making processes would assumedly differ.

Newly developed theories, such as group valence theory, are expected to be examined and validated in future EIM research as the rise of individual influence in IT decision making might gradually involve a group-oriented effect or some organizational forces might compel individual employees to adopt the technology regardless of the perceived usefulness and/or perceived ease of use at the individual level. We hope future research can further investigate EIM adoption and use from the theoretical lens of technology adoption by groups proposed by Sarker et al. [75], who posited that technology adoption, at the group level, is determined by the degree of positive or negative feeling toward a certain opinion.

The next limitation is related to methodological issues. For the constructs, perceived security, and perceived risk, the way the items have been constructed may be ambiguous for some respondents. Although we have demonstrated how these constructs are theoretically distinct in the paper, the survey respondents would have benefited by clear definitions of the key terms in the questionnaire. Future studies are encouraged to clarify any ambiguity in constructs while administering the survey. Additionally, it is expected that cultural diff-erences on EIM acceptance need to be investigated because some parts of the world use IM

as asynchronous device. It is hoped that this research serves as a starting point for future research in the area of IM use in business settings.

CONCLUSION

This study provides empirical evidence to IS adoption literature by identifying important factors that determine the adoption of EIM in organizations where employees are driving the adoption of new business communication technology as they demand more flexible and efficient ways to work. Our results show that the growth in EIM will continue in areas where the primary work responsibilities are compatible with using EIM. Further, having more users of EIM helps increase the value of their networks as well as drive the use of EIM. With respect to importance and opportunities provided by EIM for collaboration and communication in organizations, further research in this area will be promising and timely. The results suggest that security issues associated with EIM can be an import-ant factor. Therefore, organizations could benefit by developing security measures and policies to alleviate fears of EIM users. The secure environment will also help safe- safe information assets of organizations. With the influx of a new generation of workers who have been incessantly using IM for social purposes, the growth of EIM in workplaces would be exponential. The distinguishing factor between organizations who can and who cannot harness or leverage the potential of EIM would be the organizational measures. Such measures include designing and implementing effective policies on EIM use. As organizations develop policies on Internet use to cope with risks of potential Internet misuse, these policies should be expanded to accommodate the use of EIM in organizations in order to fully capitalize on the benefits of EIM.

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APPENDIX A. RESULTS OF COMMON METHOD BIAS ANALYSIS

Construct	Item	Substantive Factor Loadings (R1)	uares of R1	Method Factor Loading (R2)	uares of R2
Perceived Connectivity	PCON1	0.961**	0.924	0.022	0.000
	PCON2	0.871**	0.759	0.044	0.002
	PCON3	0.959**	0.920	0.044	0.002
	PCON4	0.802**	0.643	0.026	0.001
Perceived Usefulness	PU1	0.765**	0.585	0.046	0.002
	PU2	0.867**	0.752	0.361**	0.130
	PU3	0.887**	0.787	0.221**	0.049
	PU4	0.902**	0.814	0.102	0.010
	PU5	0.756**	0.572	0.172	0.030
Perceived Ease of Use	PEOU1	0.734**	0.539	0.131	0.017
	PEOU2	0.844**	0.712	0.165	0.027
	PEOU3	0.826**	0.682	0	0.000
Enjoyment	ENJ1	0.998**	0.996	0.139	0.019
	ENJ2	0.768**	0.590	0.068	0.005
	ENJ3	0.823**	0.677	0.077	0.006
	ENJ4	0.799**	0.638	0.134**	0.018
Playfulness	PLFL1	0.903**	0.815	0.146	0.021
	PLFL2	0.858**	0.736	0.137	0.019
Compatibility	COMP1	0.824**	0.679	0.172	0.030
	COMP2	0.811**	0.658	0.419**	0.176
	COMP3	0.833**	0.694	0.115	0.013
Intention	ITU1	0.796**	0.634	0.172	0.030
	ITU2	0.884**	0.781	0.019	0.000
	ITU3	0.956**	0.914	0.079	0.006
	ITU4	0.955**	0.912	0.085	0.007
Image	IMG1	0.903**	0.815	0.037	0.001
	IMG2	0.934**	0.872	0.037	0.001
Security	SEC1	0.986**	0.972	0.009	0.000
	SEC2	0.977**	0.955	0.009	0.000
Risk	RSK1	0.955**	0.912	0.064	0.004
	RSK2	0.892**	0.796	0.062	0.004
Average		0.872	0.766	0.107	0.020

** p, 0.01

APPENDIX B. SURVEY ITEMS

Perceived Connectivity

Most of my colleagues use EIM.

Among the colleagues I communicate with regularly, many use EIM. Few colleagues I communicate with use EIM (reverse code).

A large percentage of my colleagues use EIM.

From my observation, the number of EIM users is large.

Perceived Usefulness

Using EIM helps me connect with others instantaneously.

Using EIM improves the efficiency of my decision making. Using EIM increases my work productivity.

Using EIM improves my work effectiveness. I find EIM to be useful in my work.

Perceived Ease of Use

My interaction with EIM is clear and understandable.

Interacting with EIM does not require a lot of mental effort. I find EIM easy to use.

Intention to Use

If I have to temporarily use a computer without EIM software, I intend to install it. If I own a computer with EIM software, I intend to use it.

Given that I have a computer with EIM software, I predict that I will use it at work. I plan to use EIM in the near future.

Perceived Enjoyment

I have fun using EIM.

Using EIM bores me (reverse code).

Using EIM provides me with a lot of enjoyment.

Overall, I enjoy using EIM.

Perceived Playfulness

I think EIM is interesting.

Overall, using EIM interests me.

Compatibility

I think using EIM would fit well with the way that I like to interact with the EIM. Using EIM would be incompatible with how I like to do things (reverse code).

Using EIM would fit into my work style.

Image

People who use EIM have a high profile.

People who use EIM have more prestige than those who do not.

Perceived Risk

I think using EIM is risky.

Using EIM will bring risk to my work.

Perceived Security

I think my information on EIM is secure.

Using EIM is secure