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An Assessment of the Influence of Functional Diversity and Perceived Information Quality on the Intention to Use Collaboration Systems

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by

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A dissertation submitted in partial fulfillment of the requirements
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We hereby certify that this dissertation, submitted by Eric Spriggs, conforms to acceptable standards and is fully adequate in scope and quality to fulfill the dissertation requirements for the degree of Doctor of Philosophy.

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An Abstract of a Dissertation Submitted to Nova Southeastern University
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Eric M. Spriggs
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The role that perceived information quality has on the intention to use a computer supported collaborative work (CSCW) system in the Federal Highway Administration is the focus of this study. The purpose of this study was to examine the functional diversity of the contributors in a CSCW as a major determinant of perceived information quality. The study relied on the Technology Acceptance Model to propose a theoretical model which shows that perceived information quality influences perceived risk and trusting belief of the users of these systems.

Both perceived risk and trusting belief shape the intention to use a computer supported collaborative work systems. This study conducted a web-based survey to validate the theoretical model. The study focused on the use of computer-supported collaborative work systems in the Federal Highway Administration. This study empirically validated the theoretical model. Scales were developed within the context of the variables (functional diversity, perceived information quality, perceived risk, trusting belief, and intention to use.) to survey discipline members at the Federal Highway Administration.

The statistical results showed support for perceived information quality's positive influence on trusting belief, perceived information quality's negative influence on perceived risk, perceived risk's negative influence on the intention to use a CSCW and trusting belief's positive influence on the intention to use a CSCW. The results also showed there is no statistically significant difference in perceived information quality by functional diversity. This study concluded that the research model showed significant results to support four of the five hypotheses proposed and helped uncover key findings on how perceived information quality can be impacted. This research served as an original contribution to CSCW while working in functionally diverse teams environments.

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Chapter 1

Introduction

Background

It may be difficult to pinpoint the exact moment in time that sparked the genesis of computer supported collaborative work systems (CSCW). Perhaps it can be traced back to the introduction of electronic mail in the Defense Advanced Research Project's Agency's (DARPA) network (Ratchukool, 2001). In the 1970s, DARPA created two programs, RDMAIL, and SNDMSG to simulate a post office mailbox system. Supplied with their own electronic mailboxes, users were able to log on, read their mail and send messages to their mutual "collaborators" mailboxes. Thus for the first time, collaboration among members of an organization at different locations experienced support from computers and software.

In the early 1980s, there was a substantial increase in the number of personal computers (PC) on office workers' desks. Advancement within the information systems technology industry is often attributed largely to the increase. Along with this escalation came the need (or perhaps simply the next evolutionary step) to connect these PCs in a networked system. Hence, the growth in the mid-eighties of local and wide area networks enhanced the capabilities of group sharing and communication. The recognition and growing appreciation of the potential benefits for individuals and groups to work together at a distance with each other in a collaborative environment slowly came to fruition.

However, with the realization came the understanding that specialized applications and products were necessary to support these groups (Guerrero, Collazos, Pino, Ochoa, & Aguilera, 2004; Samarah, Paul, & Tadisina, 2007; Zigurs & Buckland,

1998). Computer Supported Collaborative Work (CSCW) gained importance in organizations worldwide. An interdisciplinary field of research and practice, CSCW focuses on developing tools, products, services, and techniques for leveraging the ability of people working on interrelated tasks in distributed or network settings. As the number of these networks grew, it became evident that processes or products were required to facilitate communication, cooperation and/or collaboration efforts (Guerrero et al., 2004; Samarah et al., 2007; Zigurs & Buckland, 1998). Networks provided a platform in an environment more conducive for allowing distant workers to collaborate.

However, research has shown that the simple act of making facilitation of communication technology available does not necessarily ensure effective collaboration practices in organizations (Majchrzak, Malhotra, & John, 2005). In the past, these networked relationships were mostly asynchronous in nature. However, to be as effective and dynamic as possible, dispersed groups need a collaborative environment that promotes true synchronous collaboration, communication, coordination, and social interaction among people within groups (Guerrero et al., 2004).

This study investigated how the users' perceived information quality of the shared information is impacted by the functional diversity of the participants within the collaborative work environment. Additionally, the purpose of this study was to address the research questions of how the functional diversity of contributors, within the organizational disciplines influence perceived information quality, which in turn influences the trusting belief, perceived risk and intention to use a computer supported collaborative work environment (CSCW).

Perceived information quality (PIQ) in a Computer Supported Collaborative Work system (CSCW) is not studied extensively in the literature. Moreover, PIQ and its predictors (such as functional diversity) as it relates to the influence it has on trusting belief and perceived risk with regards to CSCW and in turn, their impact on intention to use a CSCW have not been studied extensively in the literature.

Problem Statement

This study investigated how the functional diversity of the participants within a CSCW influences PIQ, which in turn influences the formation of trusting belief, and perceived risk on the intention to use a CSCW. In particular, the interest is in understanding the ways in which participants are motivated to use the CSCW. Many collaborative work systems and new technologies suffer from non-use or low levels of organizational participation (Chuan-Chuan Lin & Lu, 2000; Jackson, Chow, & Leitch, 1997; Luarn & Lin, 2005; Teo, Lee, Chai, & Wong, 2009; Teo & Noyes, 2011; Wangpipatwong, Chutimaskul, & Papasratorn, 2008). These low levels of participation result in ineffective team efforts, and organizational performance are often found to be below expectations as projects, or corporate objectives are not attained.

Perceived information quality (PIQ) is an important issue due to the impact it has on participants' intention to use a CSCW. Perceived information quality refers to the overall judgment and evaluation of the quality of information, access to the degree of accuracy, informativeness, timeliness, and relevance of information provided by the system (Kim & Niehm, 2009). In their studies, Fung and Lee (1999) and Keen, Ballance, Chan, and Schrump (1999) found that information quality is an important trust-building mechanism in online interactions. Also, Nicolaou and McKnight (2006) concluded that

perceived information quality has an impact on trusting belief, and the perceived risk impacts the intention to use a CSCW. Almahamid, Mcadams, AL-Kalaldeh, and AL-Sa'eed (2010) found a positive relationship between PIQ and intention to use a government website for collecting information and making transactions. Consequently, there may be a reasonable expectation that CSCW use is strongly influenced by PIQ on discipline SharePoint sites. This study provides an opportunity to increase understanding of the predictors of PIQ.

However, the findings in the literature have been mixed (Ajzen & Fishbein, 1977). Moreover, these studies have not specifically investigated perceived information quality, and its predictors such as diversity and the users' position within the organizational hierarchy as they relate to the influence it has on perceived information quality, trusting belief, perceived risk, and the intention to use a CSCW.

Another avenue of investigation for this study was how perceived information quality affects trusting belief and perceived risk within the CSCW, and how the organizational structure affects the intent of the participants in contributing data to the collaborative work environment. According to Nicolaou and McKnight (2006), perceived risk and trusting belief influence the relationship between PIQ and the intention to use a CSCW environment. This is significant because the ability to utilize predictors of PIQ may assist the management of the trust, risk, and motivation in the development and implementation efforts of CSCW environments, which is the anticipated benefit of the research.

Dissertation Goal

The leadership of the Federal Highway Administration created the Discipline Support System (FDSS) launched in 2008. The goal of FDSS is to provide a consistent framework for all of the agency's disciplines (hard engineering and soft engineering) to foster a unified environment for workforce growth, development and nurturing. One major facet for the FDSS is the utilization of virtual collaboration technologies to supplement many of the initiatives it has implemented to enhance the overall transfer of knowledge, training, and social networking opportunities.

FHWA has invested much time, effort, and money on a collaboration solution – Microsoft SharePoint – to make technology accessible to allow the formation of a consistent architecture to house information critical for the advancement and support of discipline members. Despite the large investment of resources, the FDSS SharePoint disciplines sites have not lived up to their potential. Moreover, they have not been fully utilized in a consistent or expected manner by the disciplines. There is a sense that many of the functions may not be well understood or accepted as an everyday business practice. Many discipline champions struggle to attract members to join in the CSCW collaboration to increase the quality of interaction and participation.

Therefore, the discipline champions need to find a way to help the membership adapt from transmission to transaction models of collaborating to help or motivate members to use the CSCW and realize the adoption of the discipline SharePoint sites. This study posited that determining the factors that impact the intention to use a CSCW such as perceived information quality, trusting belief and/or perceived risk might assist discipline champions to identify methods to improve CSCW utilization within FDSS.

A few discipline champions have the skill set to manage or be active site owners of the SharePoint sites while the others feel overwhelmed at the prospect of maintaining the CSCW. The problem that most encounter is developing premium SharePoint site, which fosters learning and enhances collaboration significantly enough to increase discipline members' acceptance and trust of the information. Moreover, the added workload creates an additional time burden on discipline champions who already feel overloaded with their "real" job. In fact, most site owners and champions are working on the CSCW as a collateral duty. Additionally, most discipline champions are team leaders, program managers, and/or Directors. Therefore, this study proposes to examine the role that perceived information quality has on the intention to use CSCW in the Federal Highway Administration

An additional goal of this study was to investigate the impact perceived information quality has on trusting belief and perceived risk and thus how the intention to use the information in collaborative work groups is impacted by the diversity of contributors and the positions within the organizational hierarchy of the contributors. Of particular interest is to gain a better understanding of the ways in which participants are motivated to use or not use the CSCW.

This study presents a contribution to the CSCW literature that may assist CSCW designers and managers, and provide users with important information that will help to mitigate or eliminate perceived risk and gain trusting belief in the disciplines collaborative environment. In addition, this study adds to the literature regarding the factors, which affect the intention to use a CSCW, which may enhance awareness of the mechanisms that drive individuals to use a CSCW.

There were two research models utilized as a platform for understanding the behavioral phenomena outlined in this study. First was the Theory of Reasoned Action (TRA). The main application of TRA is for the prediction of intentional behavior. The second research model employed in this study is the Technology Acceptance Model (TAM). TAM is a research model that is concerned with how users come to accept and use available technology. These two models present a combined framework suitable for this study.

This study investigated hierarchical organizational positions and organizational diversity. This research endeavored to improve the understanding of the issues and concerns associated with the CSCW environment in the Federal Highway Administration (FHWA). Additionally, this study was valid and relevant to any organization but is particularly important for an organization where information quality is a focused area of growth. The FHWA was the subject of this study due to the organization's focus on information quality and the governance thereof.

This study's specific area of investigation was to determine how the functional diversity of the participants within a collaborative work system environment affects the formation of perceived information quality, which in turn influences trusting belief and perceived risk within the organizational structure and so influences the intent to use a CSCW.

In pursuing this goal, the researcher investigated the CSCW environment of the Federal Highway Administration (FHWA) with a specific focus on agency-wide initiatives, which strategically addresses organizational work competencies, and learning

and development in a CSCW, specifically SharePoint. SharePoint is a CSCW application the organization uses to achieve its requirements for virtual collaboration.

The FHWA Discipline Support System (FDSS) SharePoint Sites are a component of FHWA's Discipline Support System. The FDSS utilizes Microsoft Office's SharePoint software as a platform for web publishing, collaboration, and information exchange. The FDSS community's SharePoint collaboration tools provide a single platform that makes it easy for members to share thoughts and collaborate.

Each discipline operates and maintains SharePoint site within the FDSS. The virtual collaboration sites created by FHWA's disciplines' teams are used to share information with members, manage documents, distribute reports and create an environment to make better decisions.

The governance of the FDSS sites rests primarily with the owners of the various discipline sites. Site owners have the responsibility for overseeing the development and maintenance of their sites. The Discipline Support SharePoint sites operate under the auspices of the FHWA Discipline Support System Council

FHWA's Information Services Team (IST) manages the FHWA SharePoint Portal and provides technology support and training for site owners and users. Each site owner sets up and manages the structure and content of an FDSS Site, as charged by the Discipline Champion(s) for that discipline and consistent with the FDSS Council's adopted practices and procedures.

Discipline site owners coordinate with the Discipline SharePoint Committee members to propose new items added to or implement changes to the Discipline Support

Site practices and procedures. Each Discipline manages and maintains its Discipline Support Site, but collaboration among the various site owners is encouraged.

The purpose of this study was to address the research questions of how the diversity of contributors, the technology support provided, and the positions of the contributors within the organizational hierarchy influence perceived information quality, which in turn influences the intention to use a CSCW environment. In addition, this study addressed the specific research questions of how the functional diversity of the contributors within a CSCW impact of trusting belief and perceived risk within the organizational structure, and how that impacts the intent of participants to use a CSCW. The research questions are summarized below in the table.

Table 1: Research Questions

Research Questions
R1. How does the functional diversity of contributors influence perceived information quality?
R2. How does perceived information quality impact perceived risk?
R3. How does perceived information quality impact trusting belief?
R4. How does perceived risk impact intention to use technology CSCW (SharePoint)?
R5. How does trusting belief impact intention to use technology CSCW (SharePoint)?

Relevance and Significance

Perceived information quality is an important issue due to the posited impact it has on participants' intention to use a CSCW. This study provided a better understanding of the predictors of PIQ. In prior research, Nicolaou and McKnight (2006), supported the position that perceived information quality had been found to impact trusting beliefs and perceived risk impacts intention to use a CSCW. However, other findings have been mixed (Ajzen & Fishbein, 1977). Moreover, these studies have not specifically

researched perceived information quality concerning its predictors such as diversity and the contributor's position within the organizational hierarchy as they relate to their influence on trusting belief and perceived risk.

This study builds upon and adds to the existing literature by constructing a research model to address how the functional diversity of contributors influences perceived information quality, which in turn influences the intention to use a CSCW. The focus of the proposed study is on perceived information quality based on a model that perceived information quality influences risk and trust belief, which in turn influences the intention to the use the CSCW.

The general research question of how PIQ and the diversity of the participants within a CSCW influence the formation of trusting belief and perceived risk within the organization, as well as the impacts they have on the intent of participants to contributing data, were all examined as part of this study. This study conducted a review of the literature about perceived information quality, which could provide scenarios that support the proposal for improving perceived information quality in CSCW.

Previous research on CSCW environment has examined perceived information quality. Nicolaou and McKnight (2006) studied three key findings in their study. First, they found perceived information quality to be highly predictive of trusting belief and perceived risk in an inter-organizational exchange. Second, they found trust and perceived risk were significant complementary predictors of intention to use the exchange and found that trust and perceived risk mediated the influence of PIQ on the intention to use an exchange.

This study focused on the relationship that perceived information quality has on the intention to use a CSCW in the Federal Highway Administration. The study relied on the Technology Acceptance Model Davis (1985) to propose a theoretical model which examines how perceived information quality influences perceived risk and trusting belief of the users of collaborative systems.

This study hypothesized that both perceived risk and trusting belief shape, the intention to use a computer supported collaborative work systems. The proposed study focused on the use of computer-supported collaborative work systems in the Federal Highway Administration. The literature review section endeavored to provide the background and justification of the contribution that this study makes to the computer supported collaborative work research literature.

In order to address the research questions posited in this research, this study worked to introduce thoroughly, discuss and analyze the underlying theories on which the study builds on – namely, the Technology Acceptance Model (TAM) and the Theory of Reasoned Actions (TRA).

Lucas Jr and Spitler (1999) found that workload, social norms, and job differences were better predictors of the intention to use a CSCW. The researchers encouraged further research on the factors of intention to use, such as perceived risk and trusting belief. In their study, (Dennis, Fuller, & Valacich, 2008) also showed that system design is critical to user perceptions of exchange information quality. This study extends prior research by examining how PIQ affects adoption through trusting beliefs and perceived risk.

Barriers and Issues

The difficulties in studying this problem arise at varying levels and need to be addressed. Foremost, the diversity of the users and the complexity of a widespread virtual organization make it difficult to collect a representative sample and accurately reflect the perceptions of the entire population. A number of issues were accepted to prevent the adoptions of CSCW implementation. Senior management may not want to utilize organizational resources to investigate or take part in the study.

It has also been noted in past research that evaluating virtual collaboration is difficult. In fact, Neale, Carroll, and Rosson (2004) identified the difficulty of evaluating virtual collaboration as an obstacle in experimentation, pointing to logistics and the high costs of using methods that require direct observation in dispersed environments. To address these barriers, this study used existing research-based instruments for evaluation.

Another barrier involved the usability of the actual workspace. Some users may avoid a CSCW due to poor design. Moreover, another barrier could be the level of technical expertise successfully needed to utilize the CSCW. Cole (2009) stated that users who identified themselves as technologically savvy still required some technical assistance and support to utilize a Wiki. This is significant because it provides empirical support, which may help elucidate extraneous variables that intention to use a CSCW.

The study participants may not fully accept the notion of a CSCW ever being trustworthy, despite all efforts. Information quality must be developed, taught, and enforced in organizations to improve information quality. Another barrier was that many organizations attempted to address information quality issues as they occur and frequently failed to identify and address the root causes of poor information quality. In

addition, the cost of poor information quality is rarely discussed. There are cost savings to improving the quality of an organization's information, yet it is never presented at quarterly briefings or in annual reports (English, 1999).

Another important barrier considered in this study was the availability of technical expertise. Technical support may not be available for assistance to users to access the full potential functionality of a CSCW. For example, if a user needs technical assistance, it might be necessary to examine the communication with technicians to understand that impact on PIQ and intention to use. This barrier may be further enhanced if users are not accustomed or have not been fully trained in the usage of the CSCW.

Assumptions

To conduct this study, the researcher made the following assumptions. Primarily this research relies on the continued existence and leadership support of the Discipline Support System (FDSS). If a new leadership structure deems the FDSS ineffective, a decision could arise to reconstitute or redesign the FDSS into a different strategic architecture. This research relied on continued usage of Microsoft SharePoint as the solution of choice for virtual collaboration at FHWA.

This research was also predicated on the existence of trusting belief and perceived risk within the organization's FDSS membership. According to Nicolaou and McKnight (2006), trusting belief means that the CSCW contributor believes that the other party has beneficial characteristics and that favorable perceptions are implied within the environment. Moreover, according to Vidotto, Massidda, Noventa, and Vicentini (2012), both a disposition to trust and institution-based trust promote trusting beliefs, intentions, and behaviors. The next assumption this study made was that the respondents complete

surveys truthfully and accurately. Finally, this study posited that only members of formally recognized discipline within the Discipline Support System (FDSS) were included.

Limitations

This study was conducted at the Federal Highway Administration (FHWA). FHWA is a small federal agency within the Department of Transportation in the Executive Branch of the United States government. The results of the study may be influenced by the fact that a large portion of the respondents are civil engineers and have a similar response factor. Therefore, the study needed to ensure a diverse population is included in the results.

Unsolicited email or "spam" is prevalent in today's world and its recipients because of advanced filtering and workers prioritizing tasks do not read more email. As a result, web-based surveys tend to have very low response rates (Beuchot & Bullen, 2005). This creates a higher risk of obtaining smaller sample sizes, thus reducing the statistical power of the data and increasing the likelihood of both Type I and Type II errors—i.e., portraying relationships where they do not really exist or not detecting relationships that exist (Mertler & Vannatta, 2005).

Therefore, this study utilized a multi-pronged approach to soliciting cooperation via a number of recognized avenues within the agency's leadership and existing professional networks as discussed earlier. First, all discipline members received an email invitation from the discipline sponsor. Second, members of individual disciplines received an invitation from discipline champions to take part in the survey.

Delimitations

This study limited the survey participants to a single federal agency within the Federal Highway Administration (FHWA). This study also limited the participation of disciplines formally represented by FHWA's Discipline Support System (FDSS). Further, this study limited the CSCW to the agency solution of choice, namely SharePoint 2010.

This study's design was used to determine the impact of how the diversity of contributors, the technology support provided, and the positions of the contributors within the organizational hierarchy influence perceived information quality, which in turn influences the intention to use a CSCW. The study is not designed to improve the ability of the subject organization to improve its current operations but to evaluate the level of impact among the subject organization's participants.

This study was undertaken with a clear understanding of the following delimitations. First, only individuals recognized as a member of one of the formally recognized disciplines will take part in the survey. Second, inaccuracy of discipline member responses may limit the outcome of the survey results.

Definition of Terms

1. Collaboration:

   > Collaboration is the process of shared creation: two or more individuals with complementary skills interacting to create a shared understanding that none had previously possessed or could have come to on their own. Collaboration creates a shared meaning about a process, product or an event (Schrage, 1991).

2. Computer Supported Collaborative Work (CSCW):

   CSCW is an environment where computers provide support to a group of people in order to accomplish a common goal or task. Additionally, CSCW is an endeavor to understand the nature and characteristics of cooperative work with the objective of designing adequate computer-based technologies (Schmidt & Bannon, 1992).

3. Discipline Support Systems (FDSS):

   FHWA's organization framework system developed to ensure learning development of the agency's workforce.

4. Diversity:

   Any significant difference that distinguishes one individual from another

5. Functional Diversity:

   The level or degree of the functional heterogeneity which exists of a group within a CSCW.

6. Microsoft SharePoint 2010:

   SharePoint is a tool the organization uses to achieve its requirements for virtual collaboration.

7. Perceived Information Quality:

   According to Nicolaou and McKnight (2006), perceived information quality (PIQ) represents the user's reaction to the characteristics of output information versus the user's information requirements.

8. Perceived Risk:

   A byproduct of the uncertainty users feel working within inter-organizational exchanges (Nicolaou & McKnight, 2006).

9. Technology Acceptance Model (TAM):

   TAM is an (IS) theory that models how consumers decide to accept and/or use a technology.

10. Technology Support:

    Collaboration technologies that support making it easier for workers that are dispersed nationally and internationally to be formed into virtual teams (Samarah et al., 2007).

11. Theory of Reasoned Actions (TRA):

    The theory of reasoned action is a model utilized to predict behavioral intention (Ajzen & Fishbein, 1977).

12. Theory of Planned Behavior (TPB):

    A theoretical model that is based on TRA centered on the idea that specific attitudes toward the behavior in question can be expected to predict that behavior (Ajzen, 1991).

13. Trusting Belief:

    Trusting belief is characterized by a user's belief that the other party has beneficial characteristics, and that favorable perception are implied within the environment (Vidotto et al., 2012).

Chapter 2

Literature Review

Introduction

A methodological review of past literature is a crucial endeavor for academic research (Webster & Watson, 2002). The need to expose what is known to the body of knowledge before initiating a research study should not be undervalued (Hart, 1998; Webster & Watson, 2002). This chapter focuses on a review of the literature pertinent to the constructs of the proposed research. The purpose of this study was to investigate whether perceived information quality (PIQ) affects the level of perceived risk and trusting belief, which in turn directly influences the intention to use the CSCW. The study also examined if the functional diversity of contributors is a predictor of PIQ. The research model of this study is presented below in Figure 1.

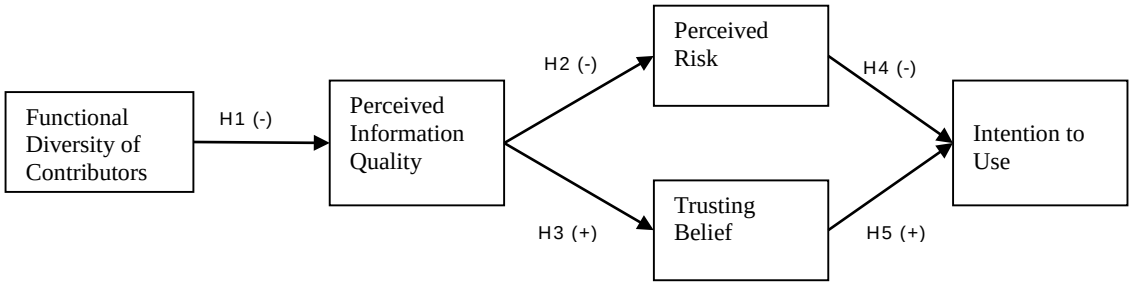


Figure 1. Research model.

This study focused on users of a CSCW in the Federal Highway Administration that is engaged in collaborative work. The CSCW users play crucial roles in collaborative efforts, training, and technical assistance in order to provide support and technical problem-solving. The members of these collaborative teams have diverse cultural, geographical and educational backgrounds. Additionally, the members have varied levels of roles and responsibilities within the organization. The team members have had a

reasonable time to know each other and to have developed relationships. However, the existence of trusting belief is at question and mitigating perceived risk may prove difficult in CSCW (Lee & Song, 2013; Pearson & Balacheff, 2003; Plotnick, Hiltz, & Ocker, 2011). Low levels of trusting belief and high levels of perceived risk can exacerbate the intention to use a CSCW, which consists of members from diverse cultural backgrounds (Jehn, Northcraft, & Neale, 1999; Shachaf, 2008; Yang, 2005).

According to Dhenesh, Sitnikova, and Slay (2012), CSCW system designers in the past decade have primarily focused supporting distributed and web-mediated meetings. Moreover, tools introduced in that time must be developed to support team collaborations like Computer CSCW tools. However, in their study Dhenesh et al. (2012) did not consider cultural diversity, work environment, management practices, but identified them as potential factors to influence tool adoption. FHWA's utilization of the CSCW offers opportunities to enhance effectiveness and efficiency. Hence, increased usage of the discipline SharePoint sites can be a key to achieving FDSS success (Dhenesh et al., 2012; Diffin, Chirombo, & Nangle, 2010; Diffin, Chirombo, Nangle, & De Jong, 2010; Herrera, 2008; Millett, Te'o, Rhodes, Clarke, & Carswell, 2005).

The literature on diversity in the workplace has become very broad and touched on a number of topic areas (Digh, 1998). Other researchers found that perceived risk was likely to decrease the intention to use the CSCW. (Lee & Song, 2013). However, According to Nicolaou and McKnight (2006), when an individual feels a high level of trusting belief, he/she will be the most motivated to use the CSCW. Moreover, group members with similar cultural, educational, organizational feature tend to trust each other without provision (Pearson & Balacheff, 2003; Plotnick et al., 2011). Hence, FDSS

members must overcome the perceived risk of contributing to the CSCW. This study posits that it can be achieved through either processes, policies or procedures designed to increase PIQ or trusting belief in the CSCW.

In fact, in the model proposed by Amabile et al. (1996), encouraging employees to take risks is considered an important organizational characteristic for promoting creativity. Moreover, collaboration in the functionally diverse environment is critical to success, and conflicts associated with diversity can become a real and important problem (Cabrales, Medina, Lavado, & Cabrera, 2008). Underlying this is the notion that individual employees will be more likely to collaborate in order to develop completely new ideas if they feel free to do so with encouragement and organizational processes the support and/or reward this type of behavior (Cabrales et al., 2008).

In order to build onto to the existing literature, this study endeavored to fill two research gaps. First, this study examined how PIQ factors into the intention of contributors to use a CSCW. Although PIQ has been heavily studied, it has not been examined in CSCW. Figure 1 above depicts how PIQ plays a significant role in the intention to use a CSCW. Second, this study also examined the functional diversity of contributors as an antecedent PIQ. This study relied principally on three theoretical models: the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM) and the Theory of Planned Behavior (TPB). Prior studies on the constructs of the research model (Figure 1) are discussed in the subsequent sections of this chapter. Literature review on the constructs is followed by the theory development of this study.

Theory of Reasoned Action (TRA)

The two models used as a resource for this research are the Theory of Reasoned Action (TRA) and the Technology Acceptance Model (TAM). TRA grew from the previous research that started out in the theory of attitude. The research on attitude soon evolved into the study of attitude and behavior. TRA arose from the efforts of (Fishbein & Ajzen, 1975). However, later researchers identified gaps left by this earlier research Traditional models in attitude and behavioral research posited weak correlations between attitudes and behaviors (Southey, 2011; Venkatesh & Davis, 2000). Moreover, later research determined that a weak correlation between attitudinal measures and performance of volitional behavior occur when a choice is possible among variables (Dillard & Pfau, 2002; Hale, Householder, & Greene, 2002). TRA (see Figure 2) provided a model, which made available a framework for researchers to predict intentions to behave based on an individual's attitudinal and customary belief patterns.

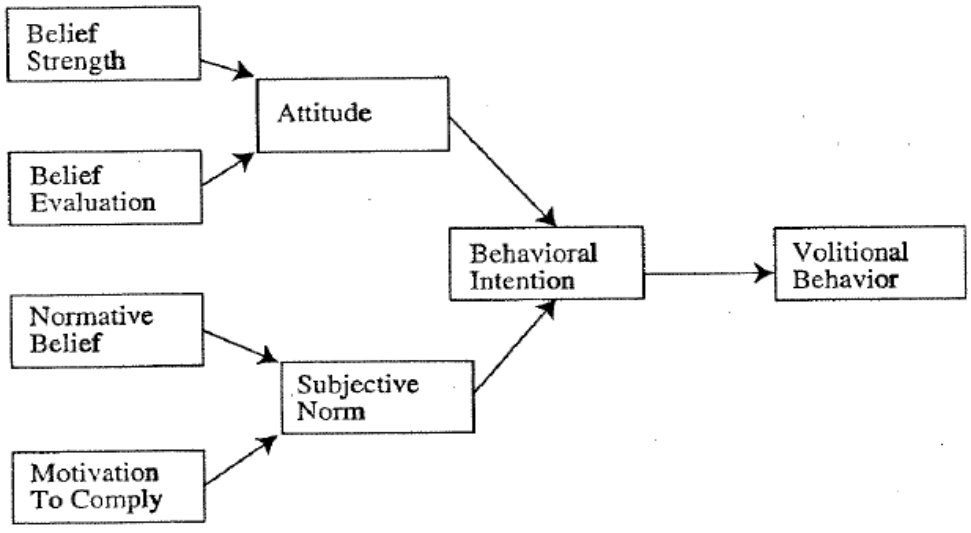


Figure 2. Theory of Reasoned Action (Hale et al., 2002).

Over the years, TRA has been used extensively to evaluate a spectrum of consumer behaviors (Sheppard, Hartwick, & Warshaw, 1988; Southey, 2011). A key

characteristic of the TRA is the assessment or prediction of the intent of subjects to behave in the context of situations. According to (Hale et al., 2002, p. 261) TRA has a key component, “the attitude or valenced response toward engaging in some volitional behavior.” In psychological terms, valence means the level of attractiveness or aversiveness of an event. This key component is what makes TRA useful for predicting behaviors. In fact, it is particularly useful when the behaviors are derived from an attitude, or assigned values from one person to another based on the attractiveness of the event, outcome, or goal to the person(s) (Sheppard et al., 1988; Southey, 2011). Moreover, Fishbein and Ajzen (1975) suggested that the attitude that a person has toward performing a behavior is a direct function of the belief held regarding the behavior.

The original conceptual usage of the model focused on the determinants and performance of behaviors (Fishbein & Ajzen, 1975). Moreover, Fishbein and Ajzen (1975), demonstrated the judgment and the approach toward alternative behavior, if influential at all, sway performance solely by means of their impacts on individual attitudes and subjective norms for the particular behavior of interest.

However, Fishbein and Ajzen (1975) noted significant shortcoming or limitation concerns the distinction between a goal intention and behavioral intention. The theory was developed to deal with certain behaviors and not events. For example, in past studies, TRA demonstrated efficacy in ascertaining how well a person’s behavior complies with attaining a goal and/or a behavioral intention such as taking a pill for dieting and applying for a loan or shopping for a new tractor (Sheppard et al., 1988). However, a shortcoming of the TRA is that it does not adequately deal with the outcomes or events that result from the behavior such as losing ten pounds, being approved for a loan or

owning that new tractor (Fishbein & Ajzen, 1975). Moreover, TRA has been criticized for disregarding the importance of social factors which determine individual behavior (Grandon & Mykytyn Jr, 2004; Werner, 2004). Initially, Fishbein and Ajzen (1975) posited that there are not many actions that fall outside of the goal or behavior intent condition. Thus, activities that are beyond the individual's control fall outside the conditions established by the model (Fishbein & Ajzen, 1975; Sheppard et al., 1988).

As in the case of this study, there are TRA studies which have investigated the intention to continue to adopt a new technology (Wei & Zhang, 2008; Maity, 1988). In fact, Wei and Zhang (2008) found using TRA and TAM that internet self-efficacy strongly predicts perceived usefulness and enjoyment, which in turn led to intention to continue to use the internet. Maity (2008) found that work-related information obtained through SMS text did not contribute to a user's intention to continue to use SMS services.

Hsu and Lin (2008) performed research, which based on TRA involving technology acceptance, knowledge sharing, and social influences. They found that social factors and attitude toward blogging significantly influenced a blog participant's intention to continue to use blogs.

However, according to the literature, the model did well in predicting goals and activities involving a choice among alternatives (Sheppard et al., 1988). Even though TRA was useful, it did not go all the way to predicting intention to use technology. Consequently, it was for this reason that a number of researchers looked to extend TRA. In fact, some researchers looked to develop models aligned to situations that do not fit neatly within the TRA framework (Albarracin, Johnson, Fishbein, & Muellerleile, 2001; Davis, 1989; Wu & Wang, 2005). The next two section discuss two of those models –

Technology Acceptance Model (TAM). TAM explains the potential user's behavioral intention to use the technological innovation (Davis, 1989). TAM is based on the theory of reasoned action and the Theory of Planned Behavior (TPB) another popular extension to TRA. The Theory of Planned Behavior (TPB) model emphasizes how an external environment influences individual's intentions (Liu & Chen, 2009).

Technology Acceptance Model (TAM)

The TAM is an information systems theory that describes how users within the system come to accept and use a technology (Davis, 1989). The TAM is an adaptation of the theory of reasoned action. Davis (1989) proposed that TAM (see Figure 3) could focus on the reasons why technology users either accept or reject an information technology product or service. According to Davis (1989), a key purpose of TAM is to supply a framework for traceability of the impact of "external variable[s] on internal beliefs, attitudes, and intentions."

Research in information systems in the early seventies was pursued because of the high cost and relatively low implementation success rate. Moreover, early Information systems (IS) research focused on features that encourage information systems use (Legris, Ingham, & Collerette, 2003). However, Legris et al. (2003) assert that this only produced long lists which did not prove valuable. Davis (1985) suggested the technology acceptance model (TAM) should be used to group factors into a model that would facilitate the analysis of information systems use. According to Legris et al. (2003), a critical gap in Davis' TAM model is that it examines the mediating role of perceived ease of use and perceived usefulness in their relation between systems characteristics (external variables) and the probability of system use (an indicator of system success).

Additionally, Legris et al. (2003) posited that TAM2 and updated version of TAM were extended to include subjective norms and tested in a longitudinal research design both together only explain about forty percent of a system's use. This suggests that there are significant factors not included in the model. Legris et al. (2003) found that TAM is a useful model but needs to integrate variables related to human and social change processes, and to adoption or innovation models.

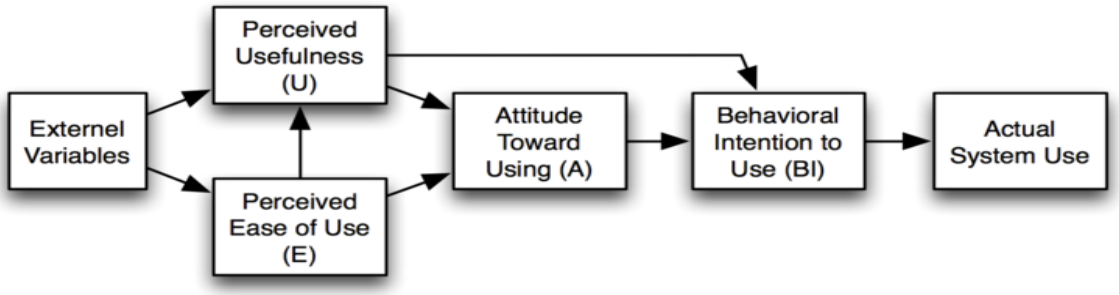


Figure 3. Technology acceptance model (Davis, 1989).

A key characteristic of TAM is that it provides a basis for tracing the impact of external variables on internal beliefs, attitudes, and intentions (Gardner & Amoroso, 2004). Key features of TAM are two factors in explaining systems use. The first factor is perceived ease of use (PEOU) which Davis (1985) defines as the degree to which a person believes that using a particular system would be free from effort. The second factor is perceived usefulness (PU) which Davis (1985) defines as the degree to which a person believes that using a particular system would enhance his or her job performance.

According to Benbasat and Barki (2007), the intense focus of research on TAM and perceived usefulness (PU) and perceived ease of use (PEOU) have distracted researchers from undertaking studies on the antecedents of belief constructs (Benbasat & Barki, 2007). However, TAM has become one of the most widely used models in

information systems research partially because of it simple and understandable approach (Benbasat & Barki, 2007). Consequently, some researchers posit that TAM has not been used to understand the antecedents of belief constructs (Benbasat & Barki, 2007).

Theory of Planned Behavior (TPB)

First introduced into use by researchers to help evaluate the behavioral aspects of technology adoption, TPB focuses on the individual's external environments impact on the subjects' intentions (Liu & Chen, 2009). TPB has been applied to studies of the relations among beliefs, attitudes, behavioral intentions and behaviors in various fields such as advertising, public relations, advertising campaigns and healthcare (Pavlou, P. A., & Fygenson, M., 2006; Reger et al., 2002; Agha, 2003; Hill et al., 2002; Larsson et al., 2004).

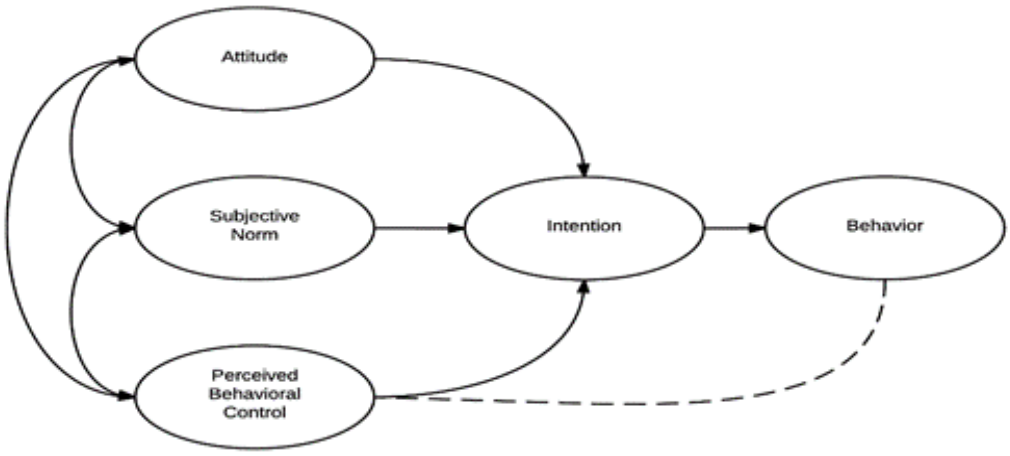


Figure 4. Theory of Planned Behavior (Ajzen, 1991).

Ajzen (1991) extended the Theory of Reasoned Action by adding the construct of perceived behavioral control resulting in the Theory of Planned Behavior (TPB). Furthermore, Ajzen (1991) posited that the variables of intentions to perform a given activity were influenced by the subjective norms, perceived behavioral control and attitude toward the behavior (see Figure 4).

The reasoning behind the addition of perceived behavioral control was that it would allow for the prediction of behaviors that were not under complete volitional control. The antecedents of attitude, subjective norm, and perceived behavioral control are analogous beliefs, reflecting the core reasoning structure (Armitage & Conner, 2001).

Lee (2008) examined the influences prompting the acceptance of E-banking, by assimilating TAM and TPB. Lee (2008) posited that intention to use E-banking was negatively influenced by the risk of privacy loss and security and that the perceived benefit, attitude and perceived usefulness positively influenced financial risk. Lee (2008) studied perceived risks and perceived benefits on the dependent values. Moreover, Lee (2008) defined privacy risk as a loss of control over personal information. Cammock, Carragher, and Prentice (2009) used the extended TPB model for predicting student intentions to apply to Northern Ireland civil service. Researchers have assessed technology acceptance using various iterations of TAM and the TPB (Chao & Lin, 2009; Lee, 2008; Armitage & Conner, 2001). TPB is one of the most commonly used models when investigating technology acceptance (Holden & Karsh, 2009). The next section discusses the research model's construct of functional diversity in the context of this study.

Functional Diversity of Contributors

While considerable research has been directed toward understanding technology adoption and/or acceptance, there have been very few studies focused on the effects of diversity of users on the adoption information technologies (Straub, Keil, & Brenner, 1997). This study examined diversity in the context of the adoption of CSCW and hypothesized that functional diversity of users influences perceived information quality,

which in its turn shapes the adoption of the CSCW. The study's theoretical model is shown in Figure 1. Diversity is defined as any significant difference that distinguishes one individual from another (Kreitz, 2007). According to Aggarwal (2010), diversity is defined as the differences among factors like ethnicity, gender, culture, sexuality and anything that makes two entities different from each other. In other words, diversity can be any difference in race, social mores, beliefs, career, physical and/or mental appearance, education and capabilities.

Aggarwal (2010) suggested diversity creates a heterogeneous environment and has become an intrinsic part of all groups, particularly virtual groups that are made up of geographically distributed membership. Moreover, the work of Dearborn and Simon (1958) suggests that individuals with similar functional backgrounds will have similar perceptions. According to Digh (1998), there are four layers of diversity which form the filters through which each of us sees the world. First is the personality layer, which encapsulates such characteristics as personal mannerisms, certain skills and/or distinct abilities. The next layer is the internal dimension, which includes characteristics such as gender, race, ethnicity, intelligence quotient, sexual orientation, and others. The third layer is the external dimension, which includes cultural, nationality, religious, marital or parental status. Finally, the fourth layer is organizational. The organizational layer comprises characteristics such as position, department, union status, leadership position or role Digh (1998); Kanter (1984) found that numerical proportions of members of different social types could account for differences in group dynamics and process. However, this finding may not have generalizability to functional diversity's impact on the intention to use.

The workforce engaged in using the CSCW is becoming more and more divergent. Virtual collaborative groups span everywhere in the global economy or can be from the same region, country, or organization. Additionally, the composition of the groups is diverse owing to a number of elements mentioned above in the layers of diversity. Moreover, Shachaf (2008) posited that modern organizations face a number of challenges in turbulent and competitive global economy that provide more opportunities for diversity challenges which impact group cohesion.

Members of any functional area may use some specific terminologies and refer specific domain knowledge. In fact, Ancona and Caldwell (1992) found in a new product development group's team members experienced mediating effects of external communication and internal processes on both functionally divergent management ratings of technical innovation, budget, schedule, and performance. Hence, when members of the same discipline exchange information, they have a better understanding of the meaning of information shared. Conversely, if members of different discipline areas exchange information, the variations in the terminologies used and the difference in the domain knowledge, which are referred to in the discussion may cause discrepancies, perceived risk, and lower level of perceived information quality.

However, Shachaf (2008) states that global virtual teams represented by divergent cultures have a positive influence on decision-making but negative influences on communication. Furthermore, Jehn et al. (1999) state that many years of social psychological research on diversity have found that the creation of knowledge and the discovery of insight by the group is dependent upon diverse viewpoints and perspectives. This may have implications on how members of a specific discipline utilize the CSCW

with members from their own discipline versus members from other disciplines in FHWA (e.g. structural engineers compared against environmental and/or safety engineers).

Perceived Information Quality

According to Nicolaou and McKnight (2006), perceived information quality (PIQ) represents the user's reaction to the characteristics of output information versus the user's information requirements. Perceived information quality refers to the overall judgment and evaluation of the quality of information, the degree of accuracy, informativeness, timeliness, and relevance of information provided by the system (Kim & Niehm, 2009). There are two definitions of information quality, which significantly characterizes and captures its universal impact – inherent and pragmatic (English, 1999). Inherent information quality is characterized by the correctness or accuracy of the information. In other words, inherent information quality is the ability the data has to reflect the real-world object that the data represents.

Pragmatic information quality is the value the accurate data in order to promote usefulness and usability. Moreover, pragmatic information quality is the degree of usefulness and value data has to support the enterprise processes that enable accomplishing enterprise objectives. In essence, pragmatic information quality is the degree of satisfaction derived by the knowledge workers who use it to do their jobs (English, 1999).

Some studies argue that its fitness for use should define information quality or information users determine the level of the quality of the information in their term of meeting or beating expectations (Lee, Pipino, Funk, & Wang, 2006; Loshin, 2001).

Moreover, in their research, Li, Kuo, Russell, and Orientations (2001) posited that information quality is achieved when it accurate, clear, detailed, relevant, easy to find, timely, up-to-date, and personalized information.

Information quality is "A multi-dimensional construct that characterizes the extent to which information is fit for use for a particular purpose " (Slone, 2006, p. 9). In most literature today, there is no disagreement over significance information quality has and that the penalties when it is poor are sometimes large (Slone, 2006). Poor information quality has had tremendous consequences financially (Redman, 2001) and led to financial losses (Su, Jin, & Peng, 2008). Boritz (2004) asserted that information quality is dependent upon system processing integrity. Boritz (2004) also posited that a system demonstrates processing integrity when it provides information that is complete, accurate, timely, and authorized.

A major challenge to agencies to improving the quality of the decision-making of senior executives is due to a number of factors such as inadequate information and the limitations of the of the information quality strategy (Slone, 2006). Organizational data and information stores are burdened with redundant and undocumented information sources. Organizational diversity also poses a challenge for the improvement of information quality.

Nicolaou and McKnight (2006) found PIQ to be highly predictive of trusting belief and perceived risk. Moreover, enhancing communication between function is paramount to successful product development, adoption, and management (Maltz, 2000). Maltz (2000) also asserted two assumptions with regard to PIQ in his work. First, the more frequently information is disseminated within a system increases the perception of

information quality. Second, all types of inter-functional communication carry the same weight in the decision-making process

In their research, Nicolaou and McKnight (2006) discussed the direct effect of perceived information quality on trust and risk during an initial exchange interaction. Moreover, Peng, Guequierre, and Blakeman (2004) asserted in their study that one of the main factors influencing route choice was trust of information accuracy of transportation information systems. According to Nicolaou and McKnight (2006) trusting belief means that a user believes that the other party has beneficial characteristics and that favorable perceptions are implied within the environment.

An example of a beneficial characteristic is that integrity exists in the other party and thus keeps commitments. Furthermore, if a user's perception of the information quality is high, there is a higher propensity for the user to believe that the current system has sufficiently enough quality to meet their needs (Khoo & Ong, 2013).

Perceived Risk

According to Nicolaou and McKnight (2006), perceived risk is a byproduct of the uncertainty users feel working within inter-organizational exchanges. In addition to a heightened sense of uncertainty, individuals from different cultures many times exhibit different styles in terms of communication and group behaviors. This variability is especially demonstrated when observing users' motivation to seek and disclose personal information and the need to engage in self-categorization (Jarvenpaa & Leidner, 1998).

According to Lee and Song (2013), trust and perceived risk are critical factors in explaining users' acceptance of new technology. Bauer (1960) provided the earliest focused attention on the perceived risk construct. In his study, Bauer (1960) claimed that

users perceive consciously and/or unconsciously that technology adoption involves risk since the results of usage cannot be predicted with certainty. Moreover, the consequences of the usage of the system may be unpleasant.

Bauer (1960) defined perceived risk as the combination of ambiguity plus seriousness of the outcome involved in the adoption of technology, product, or service. Correspondingly, Peter and Ryan (1976) thought of perceived risk (PR) as an influence on choice decisions and defined it as the expectation of losses associated with usage of the system and as such act as an inhibitor to use. Peter and Ryan (1976) also conceptualized perceived risk as being composed of two distinct components, the probability of loss and consequence or importance of that loss (Ahn, Park, & Lee, 2001). In fact, in online shopping, when consumers' perceived risk is low, their purchase intention is high (Jarvenpaa et al., 1999).

Perceived risk is the contributor's level of uncertainty about the outcome of a purchase or a decision to use a CSCW. There are a number of theoretical models used to predict user acceptance of information, communication, and collaboration technologies (Andriessen & Andriessen, 2003; Davis, 1985, 1989; Dennis & Valacich, 1999; Fishbein & Ajzen, 1975; Nicolaou & McKnight, 2006; Pavlou, 2003). Further research has shown that perceived risk is a critical factor in understanding and explaining a users' acceptance of a collaborative technology tool or service (Lee & Song, 2013). According to Featherman and Pavlou (2003, p. 454), perceived risk is defined as "the potential for loss in the pursuit of the desired outcome of using an e-service." Their research highlighted the importance of risk perception and the intention to use technology.

Lee and Song (2013) assert that perceived risk is a critical factor to be considered in any online or collaborative business environment. High levels of perceived risk of consumers may be attributed to the reluctance to join and participate in a CSCW. This research sets perceived risk of CSCW as a construct to investigate to determine the exact impact of perceived risk on the intention to use a CSCW in FHWA. Moreover, according to Lee and Song (2013) trust and perceived risk are shown to be direct antecedents of intention to use.

Trusting Belief

According to McKnight (2005); McKnight and Chervany (2000); trusting belief is defined as a secure conviction that the other party has favorable attributes (such as benevolence, integrity, and competence), strong enough to create trusting intentions. Additionally, McKnight and Chervany (2000) also identify beliefs as a key component of trust. Hence, in order to grasp fully the concept of trusting belief a brief review of trust is required. Trust like any other behavioral trait may influence the ability to develop trusting belief in a CSCW. In their study, D'Agostini, Winckler, and Bach (2013) define trust as a concept present in different kinds of applications for various purposes. In their study, McKnight and Chervany (2001) found that institution-based trust will link more strongly to trusting belief than a disposition to trust.

The institution-based trust construct comes from sociology. According to McKnight and Chervany (2001, p. 3), "Institution-based trust means one believes the needed conditions are in place to enable one to anticipate a successful outcome in an endeavor or aspect of one's life." The basis of this kind of trust is formed from the sociological belief that people can rely on structures, situations, or roles (McKnight &

Chervany, 2001). Disposition-based trust is found in the psychology literature. According to McKnight and Chervany (2001, p. 4), “Disposition to trust means the extent to which one displays a consistent tendency to be willing to depend on general others across a broad spectrum of situations and persons.” The formation of this kind of trust comes from the psychological trait that people have a general propensity to rely on one another (McKnight & Chervany, 2001).

This is because situations have stronger effects on belief than the innate disposition. Therefore, users tend to give different degrees of importance for different aspects of trust (D’Agostini et al., 2013). According to Cho (2006), dimensions of trust are related to characteristics used to evaluate the trustee’s trustworthiness. Moreover, Kramer (1999) posited that trust is based on categories. The categories of trust are predicated on information related to the trustee’s membership in a social or organizational category (Kramer, 1999). In fact, a person may have a trusting belief that has been formed through the transference process with information conveyed by third parties (Papadopoulou, Andreou, Kanellis, & Martakos, 2001).

According to Plotnick et al. (2011), early trust in a virtual environment predicts later trust. In fact, they further asserted that trust in CSCW is multidimensional and can increase over time. Their study confirms earlier studies that personal trust and process trust from the longer-term trust. Personal trust is described as the trust, which is related to socio-emotional processes. Process trust is related to task processes. Therefore, in any effort to examine the impacts and/or effects of the variable introduced in this study, it is imperative to understand the importance of external drivers of trust within the context of the research model. External drivers such as communication facilitated by social

communication and exchanges such as communication that convey enthusiasm are important drivers to trust (Coppola, Hiltz, & Rotter, 2004). Additionally, Coppola et al. (2004) assert that a group member's action such as the ability to cope with tasks and technical uncertainty, individual initiative, a member suggested topic, and volunteerism facilitate trust. In order to sustain trust, leadership should be rotated among member.

According to Pearson and Balacheff (2003) trust in computer systems provides users with reassurances that the computer environment will behave in a way for a particularly expected purpose. Furthermore, Pearson and Balacheff (2003) states a trusted computer systems should decrease perceived risk in three ways to be effective. First, trust answers the questions of whether the users is appropriately authorized or authenticated. Next, the trusted computer platform provides users the confidence that the computer platform will behave in the way that is expected to behave. In other words, computer platform has integrity. Finally, a computer platform that is trusted provides the users with a sense of assurance that the system is what it projects to be.

In their 2011 study, Plotnick et al. (2011) asserted that Partially Distributed Teams (PDTs) are becoming common in the global economy. This increases the need for addressing trust in systems where teams are distributed over a geographic distance. Plotnick et al. (2011) further asserted that trust is a crucial factor for the effective functioning of the virtual team. Their study found that early trust predicts later trust. In their study, Jarvenpaa, Tractinsky, and Saarinen (1999) posited that culture affects the antecedent of trust. According to Jarvenpaa et al. (1999), there are a number of factors other than size and reputation that affect trust within heterogeneous groups. However, in their study, Jarvenpaa and Leidner (1998) found that global virtual teams may experience

early or rapid trust, but that trust is may also be fleeting, delicate and may exist for only a short period of time.

Intention to Use

TRA posits that the most important determining factor of behavior is the behavioral intention (Fishbein & Ajzen, 1975). According to Glanz, Rimer, and Viswanath (2008), behavioral intention is the perceived likelihood of performing a behavior. The construct intention to use seen in Figure 1, originated from TRA literature (Fishbein & Ajzen, 1975). The explosive growth of technology systems with an ever-evolving technical environment can make adoption of the CSCW a daunting task for users of diverse functions. The requirements of users of these systems may conflict further internal requirements, further compounding the technical problems of adoption (Jackson et al., 1997). Many prior research efforts have findings, which explain the relationships of behavioral intention to use an information system (IS).

As stated above, TRA found that use is the implementation of an intention (Fishbein & Ajzen, 1975). Additionally, TAM, which utilized TRA's model to adapt the concept to computer technology adoption, provided a vehicle for further research on the intention to use technology. Jackson et al. (1997) found that many factors play an important role explaining behavioral intention to use. Furthermore, Jackson et al. (1997) found that many of these factors are psychological in nature and need to be considered. TAM provides finding that acceptance of technology is determined by the person's voluntary intention of using the technology Jackson et al. (1997).

Furthermore, Ajzen and Fishbein (1980) found that attitudes towards an object influence intentions, which, in turn, influences behavior regarding the object considered

for use. Much of the IS research has focused on the attitude towards the output of the system, rather than using systems.

The investigation of motives for technology adoption remains an important research area. As stated earlier, the rapid advances in technology and the sophistication of systems requires a deeper understanding of behavior associated with adopting technology. Although there have been a number of studies focused on various technology adoption and intention to use based on TAM (Chung, Park, Wang, Fulk, & McLaughlin, 2010; Pedersen & Ling, 2003), few have focused primarily on functional diversity of contributors and CSCW adoption. Furthermore, Ajzen and Fishbein (1980) found that attitudes towards an object influence intentions, which, in turn, influence behavior regarding the object considered for use.

In summary, an individual's intention to use a CSCW in the FHWA is posited to be influenced by the functional diversity of contributors, which in turn influences PIQ, in turn influencing perceived risk and trusting belief

Overview of the Research Model

This study builds upon the literature above positioning trusting belief and perceived risk and antecedents of the intention to use a CSCW. Nicolaou and McKnight (2006) found trusting belief and perceived risk to be significant complementary predictors of the intention to use and found that they mediated the influence of PIQ on the intention to use a data exchange. This study examined these relationships in a CSCW. This study justified the role of the antecedent of functional diversity of the contributors in the model for PIQ. Figure 1 illustrates the research model.

Antecedents of PIQ

Functional diversity influences PIQ (Rieh & Belkin, 1998). In fact, Maltz (2000) suggested that members of diverse groups were more likely to have a lower perception of information quality when the information came from a diverse discipline. Moreover, Maltz (2000) concluded that managers should consider the relationship between total communication frequency and perceived information quality and how other functional areas transmit information most favorably. Moreover, Maltz (2000) found the frequency with which a sender and receiver communicate impacts PIQ. Hence, in reference to this study disciplines need to collaborate than at the minimum level to enhance PIQ. In particular, contributors in a CSCW with multiple thought group areas such as FHWA disciplines must acknowledge the variability of assessing PIQ and initiate intervening action to mitigate areas that decrease PIQ due to functional diversity by increasing collaboration opportunities. This study's definition of PIQ adopts the most relevant aspects, but not all characteristics of PIQ found in the literature by uniting portions of inherent and pragmatic features. A major challenge to agencies to improving the quality of the decision-making of senior executives is due to a number of factors such as inadequate information and the limitations of the of the information quality strategy (Slone, 2006).

Past research has done little to study specific antecedents of PIQ, such as functional diversity that could influence PIQ by improving the management and oversight of CSCW environments. Functional diversity pertains to the specific information a contributor reacts to or initiates within the CSCW. Moreover, functional diversity is important because researchers need to know how contributing information

affects the intention to use a CSCW and then devise effective methods to improve participation in CSCW across functional lines within organizations.

Jehn et al. (1999) refer to functional diversity as informational diversity. According to Jehn et al. (1999), informational diversity is the difference in knowledge and perspectives that members bring to the group. Groups with diverse members often prove ineffective in taking advantage of that informational diversity, and managers of functionally diverse groups find it difficult to ensure highly diverse teams work together effectively (Maltz, 2000; Sarin & O'Connor, 2009; Webber, 2002). Jehn et al. (1999) posited that informational diversity is positively related to the performance of the organizational workgroups. Jehn et al. (1999) found that informational diversity leads to conflict among group members. In fact, informational diversity was positively related to task conflict in work groups (Jehn et al., 1999). Additionally, functional diversity exacerbates different types of conflict, which in turn affects a number of perception, attitudes, and behaviors including perceived performance, actual performance, satisfaction, intent to remain in the group and commitment.

This study hypothesized that the greater the degree of functional heterogeneity in a CSCW, the more likely that the contributor will have a higher degree of PIQ. Therefore, a low degree of functional diversity produces a higher PIQ, and a lower degree of functional diversity will produce a higher PIQ. This expectation was summarized in the following hypothesis:

H1: *In CSCW environments, perceived information quality will be higher when discipline membership is the same than when discipline membership is different.*

Direct Effects of Perceived Information Quality on Perceived Risks

This study examined PIQ's impact on trusting belief and perceived risk in a CSCW. CSCW naturally invokes uncertainty and perceived risk responses on it contributors (Mooij & Smeets, 2001; Schepers, de Jong, Wetzels, & de Ruyter, 2008; Sitkin & Weingart, 1995). In this study, perceived risk is defined as the byproduct of the uncertainty users feel contributing within a CSCW for the potential loss of the desired outcome.

This study posited that PIQ negatively influences uncertainty because the information that is considered of high quality, credible and has cognitive authority or competence provides enough assurance that the CSCW is managed in a stable manner. Therefore, a strong belief that the CSCW is trustworthy and provides the service expected leads to mitigation of perceived risks regarding contributing to the CSCW. In turn, perceived risk related to contributing to the CSCW higher quality information imparted on the information presented in the CSCW. Hence, PIQ will influence perceived risk because the information contributed to the CSCW if high quality and provides need gaps to achieve outcomes. Moreover, a contributors' strong belief that the CSCW's information is accurate, reliable, credible, comprehensive, and valid and instills a high level of cognitive authority would lessen perceived risk regarding the CSCW. This expectation was summarized in the following hypotheses:

H2: *In CSCW environments, perceived information quality will negatively influence the level of perceived risk.*

Direct Effects of Perceived Information Quality on Trusting Beliefs

Trusting belief is the user's confidence that other contributors to the CSCW have beneficial incentives and those favorable perceptions of the CSCW environment. Moreover, a number of authors define trust as the ability to believe in the reliability, truth, ability, or strength of someone or something. (Cummings & Bromiley, 1996; McKnight, 2005; McKnight & Chervany, 2000, 2002; Papadopoulou et al., 2001; Pearson & Balacheff, 2003; Vidotto et al., 2012). In prior studies, the concept of trust is divided into several interrelated components such as trusting beliefs (e.g., benevolence, competence, honesty, and predictability), trusting intentions, trusting behaviors, a disposition to trust, and institution-based trust (Vidotto et al., 2012). The formation of trust addresses the level of uncertainty about the reliability of the potential partners or contributors stemming from a lack of information them (Gulati & Gargiulo, 1999). Trusting beliefs in regards to a CSCW means that a person believes that the other contributors in the CSCW have beneficial characteristics, and this belief instills favorable opinions.

According to Jones and Marsh (1997), little investigation has been carried out into the role of trust in a computational context beyond security issues (Reiter, 1996), or the human-machine relationship (Muir, 1987); (Arion, Numan, Pitariu, & Jorna, 1994)). This study defines PIQ as the representation of the contributor's reaction to the characteristics of output CSCW information (i.e. currency, accuracy, relevance, completeness, and reliability) versus the contributor's information requirements.

In fact, (Carr & Smeltzer, 2002), found in their study that managers who were interviewed felt technology itself did not build trust. Moreover, Fung and Lee (1999)

asserted that PIQ builds trust in online interactions. Since PIQ traits characterize currency, accuracy, relevance, completeness, and reliability, should instill trusting belief in the CSCW. In turn, a CSCW participant may trust a CSCW contributor information that is truthful; credible; relevant to the topic area; consistently reliable; and dynamic (Giffin, 1967). PIQ replicate information which is responsive, timely to the CSCW participants' needs (Goodhue & Thompson, 1995). In fact, a person may have a trusting belief that has been formed through the transference process with information conveyed by third parties

In their research, Nicolaou and McKnight (2006) discussed the direct effect of perceived information quality on trust and risk during an initial interchange interaction. Moreover, Peng et al. (2004) asserted in their study that one of the main factors influencing route choice was trust of information accuracy of transportation information systems. According to Nicolaou and McKnight (2006) trusting belief means that a user believes that the other party has beneficial characteristics and that favorable perceptions are implied within the environment.

Therefore, to increase trusting belief, CSCW platforms organizations must do more than providing the technological environment for collaboration. Organizations must build in mechanisms and/or processes which ameliorate low levels of trust by leveraging requisite traits of PIQ such as accuracy, reliability, credibility, comprehensiveness, validity and cognitive authority (Goodhue & Thompson, 1995; Rieh & Belkin, 1998). Wilson (1983) found that cognitive authority is clearly related to credibility. Oftentimes, in organizational vernacular, cognitive authority is referred to as "street credibility" (Tsagkias, Larson, Weerkamp, & De Rijke, 2008). According to Wilson (1983),

cognitive authority is the influence on others thoughts or opinions based on credibility and worthiness of belief.

This simply means that the perception of the quality of information provided by the individual or institution is high because of reputation, position or level of authority. Moreover, Nicolaou and McKnight (2006) found that PIQ is an important antecedent of trust. Therefore, PIQ should positively influence trusting belief benevolence in a CSCW PIQ is achieved when information in the CSCW is accurate, and reliable when the contributor has cognitive authority. As recent research posits that positive relationships between the perception information quality and trust exist (Floh & Treiblmaier, 2006; Kim & Han, 2009; Sunil, Ramasubbu, Krishnan, & Claes 2006; Wang, Wang, Cheng, & Chen, 2009). Therefore, PIQ should be related positively to trusting belief. This expectation was summarized in the following hypothesis:

H3: *In CSCW environments, perceived information quality will positively influence the level of trusting belief in the CSCW contributors*

Direct Determinant on Intention to Use

In the CSCW context, intention to use means the intent to contribute to the CSCW in the future. This study intention to use based mainly on the theory of reasoned action (TRA) (Fishbein, 1975). The TAM is an information systems theory that describes how users within a system come to accept and use technology (Davis, 1989). The TAM is an adaptation of the theory of reasoned action. Davis (1989) proposed that TAM (see Figure 3) could focus on the reasons why technology users either accept or reject an information technology product or service. According to Davis (1989), a key purpose of TAM is to

supply a framework for traceability of the impact of "external variable[s] on internal beliefs, attitudes, and intentions.

TAM has received significant attention in IT/IS acceptance literature (Benbasat & Barki, 2007; Chung et al., 2010; Davis, 1985; Featherman & Pavlou, 2003; Gewald & König, 2005; Legris et al., 2003; Malhotra & Galletta, 1999; McKnight, Cummings, & Chervany, 1998; Olliges, Mahfood, Seminary, & Tamashiro, 2005; Pai & Huang, 2011; Piccoli & Ives, 2003; Straub et al., 1997; Sun & Zhang, 2006; Teo et al., 2009; Venkatesh & Davis, 2000; Venkatesh & Morris, 2000; Wangpipatwong et al., 2008; Wu & Wang, 2005). According to the TAM, system usage behavior is determined by the intention to use a particular system, which in turn, is determined by the perceived usefulness and perceived ease of use of the system.

Perceived Risk and Intention to Use a CSCW

Research have revealed other variables which may predict intention to use (Jackson et al., 1997; Lu, Hsu, & Hsu, 2005; Luarn & Lin, 2005; McLeod, Pippin, & Mason, 2009; Nicolaou & McKnight, 2006; Zheng, Zhao, & Stylianou, 2013). In fact, there have been studies which make known that perceived ease of use and/or usefulness do not specifically relate to an intention to use technology (Lucas & Spitler, 1999; Segars & Grover, 1993). Moreover, Lucas and Spitler (1999) found that other variable such as social norms and job differences predicted usage.

Furthermore, Segars and Grover (1993) assert that ascertaining the structure of psychological constructs such as "ease of use" and "usefulness" is difficult. However, elucidating how these concepts perform over diverse users and technologies is critical to explicate levels of usage or intent adequately. Additionally, Segars and Grover (1993)

posits “no absolute measures for these constructs exist across varying technological and organizational contexts.” However, it is reasonable to posit that task and/or a user attribute alter the nature of the perceptions that explain the intent to use a technology use.

These studies highlight the importance of investigating other determinants of intention to use a CSCW such as perceived risk and trusting belief. Bauer (1960) proposed that behavior can be seen as risk-taking, In his study, Pavlou (2002), asserts that perceived system risk as the overall amount of uncertainty perceived by an organization in a particular situation. The perceived risk associated with online transactions may reduce perceptions of behavioral and environmental control, and this lack of control is likely to influence negatively usage intentions (Pavlou, 2003).

Moreover, perceived risk will negatively affect willingness to perform risky behaviors (Sitkin & Pablo, 1992). Bélanger and Carter (2008) studied the effects of trust and risk on intention to use an electronic government service. They found that trust in the internet, trust in the government, and perceived risk all affected use intentions. The perceived risk associated with contributing to a CSCW may reduce the contributor’s perception of behavioral control, and the degree to which this occurs might negatively influence intention to use a CSCW. “Perceived behavioral control refers to people’s perception of the ease or difficulty of performing the behavior of interest” (Ajzen, 1991, p. 183). According to Pavlou (2003, p. 7), “trust creates positive attitudes and perceived behavioral control toward transactions” thereby reducing uncertainty and providing an expectation for a favorable outcome. This creates a positive influencing behavioral intention to transact. This study posits that a similar reaction occurs in a CSCW. Therefore, since the use of a CSCW is a risky venture, perceived risk is likely to

influence the intention to use it negatively. This expectation was summarized in the following hypothesis:

H4: *In CSCW environments, perceived Risk will negatively influence the intention to use*

Trusting Belief, Perceived Risk, and Intention to Use a CSCW

According to Lee and Song (2013) trust like perceived risk has shown to be a direct antecedent of intention to use. In their study, Gulati and Gargiulo (1999) found that trust reduces uncertainty about a partner. According to (Barber, 1983), trust facilitates expectations about the future behavior of others, implying a history of trust and use of that history to reason about future actions. According to Akamavi and Kimble (2005), trust has an important linkage to organization culture and knowledge sharing and although communication and information technology allow and support organization but trust is needed and vital for effective knowledge sharing. Moreover, some researchers assert that building trust is the greatest challenge faced by virtual organizations (Jarvenpaa & Leidner, 1998; Jarvenpaa et al., 1999)

Research has considered trust as a factor for the adoption of CSCW systems. For example, low levels of interpersonal trust may be a key factor in groupware adoption (Andriessen & Andriessen, 2003). Moreover, Kelly and Jones (2001) argue that social bonds, established relationships, and social contacts are of utmost importance for the successful implementation of groupware technology in a financial service company. Similarly, Brown, Poole, and Rodgers (2004) found that medical practitioners' resistance to telemedicine could be overcome by establishing trusting relationships between involved parties. In their study, (Brown et al., 2004), found that medical specialists were

concerned about the consequences of the sharing knowledge in CSCW systems because of the potential for loss of referrals since collaborators would gain confidence in their abilities to diagnoses and prescribe remedies, which would, as a result, deprive the specialist of future patients and thus income by increasing competition.

Since trusting beliefs assess competence, benevolence, and integrity of CSCW contributors, it follows that it influences the intention to use a CSCW. In e-commerce, Gefen, Karahanna, and Straub (2003) show consumer trust in an e-vendor to directly relate to an intention to use online shopping, Researchers in e-commerce have found that trust influences intended use (Gefen et al., 2003). Moreover, researchers have found that trust has a direct effect on behavioral intention to use a healthcare reporting system (Wu, Shen, Lin, Greenes, & Bates, 2008). Hence, the expectation CSCW contributors with high trust levels will be positively motivated to use the CSCW. This expectation was summarized in the following hypothesis:

H5: *In CSCW environments, trusting belief will positively influence the intention to use a CSCW.*

The methodology by which the research questions and hypotheses will be examined is presented in the next chapter.

Chapter 3

Methodology

Overview of Research

Chapters 1 and 2 identified the research questions, defined the scope of the variables and justified the hypotheses to be tested. The purpose of this chapter is to offer an overview of the research methodology of the study. This chapter outlines the research questions, processes, and the design of the study, methods, population, data collection, and data analysis that were employed in this study. The methods of this study were utilized to gather and analyze data in order to address and answer the research questions. A cross-sectional analysis was conducted to collect the data for this study.

According to Pinsonneault and Kraemer (1993), when analyzing the relationships between variables, survey research provides researchers with an effective methodology when employed properly. The research model (see Figure 1) illustrates the proposed relationships between independent and dependent variables and a survey method will be used to investigate them. The measures for all constructs are explained, and validity and reliability of the measurement instruments are discussed. Additional pertinent sections describe the population, survey instruments, data collection, statistical method, and analysis of the data.

Research Setting

The data analyzed in this study was collected from the employees of a small federal agency within the Department of Transportation (DOT). Random samples of discipline members engaged in the agency's FDSS were invited to participate in the study. Instructions and background information on the study were provided to the

participants. The discipline members were provided two weeks to respond to a web-based survey. The Federal Highway Administration (FHWA) is an agency within the U.S. Department of Transportation that supports State and local governments in the design, construction, and maintenance of the Unites States' highway system. FHWA has two major focus areas – the (Federal Aid Highway Program) and various federally and tribal-owned lands (Federal Lands Highway Program) – through financial and technical assistance.

FHWA's mission is to improve mobility the Nation's highways through national leadership, innovation, and program delivery to ensure that America's roads and highways continue to be the best in the world (FHWA, 2014). FHWA is dedicated to ensuring that America's transportation system is the best in the world through its roles as leaders for national mobility, stewards for national highway programs, and as Innovators for a better future. The FHWA organization delivers program services to FHWA's partners and customers. This organization consists of a field-distributed, Resource Center remote offices housing advanced transportation professionals strategically located around the country (5 locations), State-level Federal-aid (52), and Federal Lands Highway divisions (3). Additionally, FHWA, headquarters' is comprised of (13) program offices. Discipline members are represented in each of these locations and had an equal chance of participating in the study.

Research Method

The design of this research was a cross-sectional survey research. The survey data was collected, and in turn, the data was used to test the hypotheses. Moreover, the researcher utilized the data collected to examine the relationship between variables of the

theoretical model. This study used a web-based survey to collect the data. For many years, research on information systems relied upon the survey method as a popular approach to answering research questions (Pinsonneault & Kraemer, 1993).

Sampling Design (Size and Characteristics)

This study used a convenience sample. FHWA was selected for the study because (1) the agency was representative of a number of federal agencies of the U.S. government, (2) detailed demographic data on the discipline membership was readily available and (3) there was considerable variation in the expansiveness of their discipline memberships' functional diversity. It is important to note that the agency instituted a number of discipline SharePoint sites for each of the disciplines.

Data for the study consisted of responses from a convenience sample of discipline members documented in the agency's CROPS database to a web-based survey. A sample of discipline members of the overall population of approximately 2372 discipline members, as outlined in Table 2 below from the 20 discipline groupings archived in the CROPS database, provided a source of the information of this study.

The FDSS's centralized list of members' database of contacts was used as the sampling frame for this study. The centralized list for disciplines members is called the Centralized Register and Organizational Profiling System (CROPS). Discipline members were sent an email with survey instructions and a hyperlink to a web-based survey. In order to improve responses from the convenience sample of discipline members, a number of communication methods were used to alert members of the survey. First, all discipline members received an email alert from the executive sponsor of the FDSS requesting participation in a forthcoming survey, encouraging participation, and assuring

confidentiality. Second, members of individual disciplines received a reminder emails to take part in the survey.

Lastly, members of the FHWA discipline council and the strategic workforce council were briefed on the study and were asked to promote participation in the study in a general announcement to all members. Prompting for participation from organizational leadership was posited to elicit higher response rates from the random sample. All discipline members were sent an invitation by discipline leadership to participate. Discipline members were sent an email with instructions and a hyperlink to the web-based survey. This procedure was anticipated to yield approximately 1000 responses, representing a reasonable response rate of approximately 45 percent.

The target population for the study was FHWA primary members of a formally recognized discipline within FHWA's Discipline Support System (FDSS). An assumption of the respondent discipline member was that they were asked by discipline leadership to use the CSCW on a regular basis in the normal course of their discipline work. This study utilized a web-based survey methodology to compare users' functional diversity, PIQ, trusting belief, perceived risk, and intention to use a CSCW.

A power analysis was conducted to determine the number of participants needed in this study (Cohen, 1988). G* Power 3.1, a power analysis program, was used to determine the minimum sample size required for the study. Ordinary least squares regression was used to test the hypotheses. The first regression model was employed to determine whether functional diversity (determined by who is on a functionally diverse team versus a non-functionally diverse team) and extraneous demographic and organizational structural Information variables (respondents' secondary discipline, grade

level, office reported to, gender, geographic location of office, educational level, race, and ethnicity) predict Perceived Information Quality (criterion variable). The α for the test of this model was set at .05. To achieve the power of .80 and a medium effect size (f^2 = .15), a total sample size of 146 was determined to detect a significant model $F(17, 128) = 1.70$.

The second regression model was employed to determine whether Perceived information quality (determined by contributor's reaction to the characteristics of output information versus the user's view of the quality of the information requirements) predicted Trusting Belief (criterion variable). The α for the test of this model was set at .05. To achieve the power of .80 and a medium effect size (f^2 = .15), a total sample size of 146 was determined to detect a significant model $F(17, 128) = 1.70$.

The third regression model was used to determine whether Perceived information quality (determined by contributor's reaction to the characteristics of output information versus the user's view of the quality of the information requirements) predict Perceived Risk (criterion variable). The α for the test of this model will be set at .05. To achieve a power of .80 and a medium effect size (f^2 = .15), a total sample size of 146 was determined to detect a significant model $F(17, 128) = 1.70$.

The fourth regression model was used to determine whether Perceived risk (determined by the specific kind of uncertainty a CSCW contributor perceives which indicates the degree of uncertainty the system user feels in the situation) predict Intention to Use (criterion variable). The α for the test of this model was set at .05. To achieve a power of .80 and a medium effect size (f^2=.15), a total sample size of 146 was determined to detect a significant model $F(17 ,128) = 1.70$.

The fifth regression model was used to determine whether Trusting belief (determined by contributor's belief that the other contributor has beneficial characteristics, and that favorable perceptions are implied within the environment) predict Intention to Use (criterion variable). The α for the test of this model was set at .05. To achieve a power of .80 and a medium effect size (f^2=.15), a total sample size of 146 was determined to detect a significant model $F(17, 128) = 1.70$.

Data Collection Instrumentation (web-based survey)

A questionnaire is an instrument used to conduct survey research. Surveys provide a way to gather information about the distinguishing features, procedures, or views of a population (Calder, Phillips, & Tybout, 1981; Creswell, 2002; Isaac & Michael, 1971; Pinsonneault & Kraemer, 1993). Discipline members to evaluate functional diversity and assess the level of trusting belief and perceived risk about their intention to continue to use the SharePoint site completed a web-based survey. Surveys offer an opportunity of acquiring information by undertaking a rigorous collection of high-quality data and reporting (Isaac & Michael, 1971).

According to Creswell (2002), surveys have been used widely in education and other disciplines for many years. In fact, surveys have been used as far back as the 1800s. Surveys have been used to solve problems that have been observed, assess needs, set goals, measure performance, establish baselines, or to track and/or analyze trends over time (Isaac & Michael, 1971).

In addition, there were a number of benefits to using a survey approach for this study. Utilizing surveys for research allowed for gathering information from large samples of the population. According to Glasow (2005), surveys allow for gathering

demographic data that describes the composition of the sample. In this study, it was very important to gather a complete picture of the disciplines, and roles played in the CSCW.

Next, surveys provided a comprehensive capacity for the inclusion of the kinds and number of variables that are studied, required minimum effort to develop and manage, and was easy for generalizing about the population. Finally, the survey also provided opportunities to elicit information about attitudes that may have proven difficult to obtain by solely utilizing observational techniques.

Despite numerous benefits that surveys provide, there were some limitations. Pinsonneault and Kraemer (1993) found that surveys are inappropriate where a comprehension of the historical perspective of phenomena is required. However, this study did not require a comprehensive knowledge of the corporate history. Pinsonneault and Kraemer (1993) found researchers do not consider limitations and sample peculiarities and how it might bias the findings of the study.

Additionally, Bell (2013) found that biases arise either from a lack of response from intended participants or in the nature and truthfulness of the responses that are received. Moreover, because misreporting may occur for a number of reasons such as fear of retaliation, privacy concerns, or simply answering incorrectly (Bell, 2013; Creswell, 2002; Glasow, 2005; Pinsonneault & Kraemer, 1993). In later sections of this paper, the researcher discusses the counterbalances in detail. A number of studies found in the literature have demonstrated that increased numbers of contacts to potential respondents result in increases in response rates, with pre-notice contact appearing to have the strongest response rate impact (Dillman, 2000; Dillman, Clark, & Sinclair 1995). Web-based surveys can be designed to provide feedback and summary statistics

about an individual's responses, which can serve as an incentive to participate and is not possible with paper-based surveys (Dillman, 2000; Schmidt, 1997).

A web-based survey was administered to collect from a sample representing FHWA Discipline Support System (FDSS) primary disciplines members. Survey notifications and follow-up reminders were sent via email and responses were collected in an online database. Data was collected from the survey, cleansed, and analyzed using SPSS. Multiple linear regression analyses were performed to test the hypotheses.

Upon review of a variety of data gathering techniques in the literature, this researcher posited that a web-based survey was appropriate for the study. A web-based survey enabled the measurement of respondents' perceptions of the constructs of the research model attributable to the characteristics of the population. Understanding the perceptual factors which may have an impact on the dependent variables of the study is improved by using a web-based survey (Kaplowitz, Hadlock, & Levine, 2004).

The targeted population from which the participants were sampled is familiar with the CSCW and involved in day-to-day operations. Furthermore, the discipline members were accustomed to completing online surveys. Additionally, a review of the literature revealed that a preponderance of analogous research efforts relies on a web-based survey. Finally, a web-based survey was selected because of additional advantages, including faster data collection, lower cost, decreased respondent error rates, global accessibility, ease of data entry and analysis, and the ability to obtain large samples (Evans & Mathur, 2005; Sue & Ritter, 2007).

As stated in the variables operationalization, the questionnaire utilized validated and reliable questions and scales from previous studies. Hence, this study's survey

instrument was adapted from instruments utilized in earlier studies. The questionnaire was developed based on existing constructs from the literature using items from validated scales.

Finally, a measurement error, which is a deviation of the respondent's answer from their true attitude, needs to be ameliorated. Measurement errors can occur for a number of reasons such as when the wording of the instrument is confusing to the respondents, the questions to do not follow a logical sequence or the overall layout of the survey is poor. A pilot study was conducted to address these potential sources of error. Members of the FDDS council were asked to review the instrument.

Operationalization of Variables

The constructs identified in the research model were operationalized using validated items from prior research (see Table 2). The TAM constructs of perceived risk, trusting belief and behavioral intention was used from items adapted from Davis (1989). The PIQ construct was adapted from (Nicolaou & McKnight, 2006). This section identifies variables in this study and details how those variables were measured. The operationalization of the variables in this study is summarized in Table 2. The first column displays the variable. The second column displays the definition and operationalization of the variables and the scales.

Table 2: Variables Operationalization

Variable	Variables Operationalization Details and Definition
Functional Diversity	The CSCW contributor's response to the question of what is their primary discipline. This with The second part of the variable response pertained to the respondent answer to the question of whether he/she was on a team with a member(s) of other disciplines. Heterogeneity was coded as 1 if the discipline member works on a team with other discipline types and as 0 if the respondent's entire team is of the same discipline type (homogeneity). • **What is your primary discipline?** ▪ 1 = Administrative and Support Services ▪ 2 = Air Quality ▪ 3 = Civil Rights ▪ 4 = Communication & Marketing ▪ 5 = Construction and Project Management ▪ 6 = Design ▪ 7 = Environment ▪ 8 = Financial Management ▪ 9 = Freight ▪ 10 = Geotechnical ▪ 11 = Human Resources ▪ 12 = Hydraulics ▪ 13 = Major Projects ▪ 14 = Operations ▪ 15 = Pavement & Materials ▪ 16 = Program and Management Analyst ▪ 17 = Program and Project Delivery ▪ 18 = Planning ▪ 19 = Safety ▪ 20 = Structures • **Are you a Resource Center employee** ▪ Yes or No • **(If <u>YES</u> above) to which RC team are you assigned?** ▪ 1 = Air Quality Technical Service Team ▪ 2 = Civil Rights Technical Service Team ▪ 3 = Construction and Project Management Technical Service Team ▪ 4 = Environment Technical Service Team ▪ 5 = Financial Management Technical Service Team ▪ 6 = Geotechnical Technical Service Team ▪ 7 = Hydraulics Technical Service Team ▪ 8 = Operations Technical Service Team ▪ 9 = Pavement & Materials ▪ 10 = Planning Technical Service Team ▪ 11 = Safety & Highway Design Technical Service Team • **If <u>NO</u>, please enter you team's name – <u>ENTER YOUR TEAM NAME</u>. Full name no acronyms.** • **Do any of the members of (insert team name) have a different primary discipline than you have?** • Yes or No • **What discipline, select all that apply?** ▪ 1 = Administrative and Support Services ▪ 2 = Air Quality ▪ 3 = Civil Rights ▪ 4 = Communication & Marketing ▪ 5 = Construction and Project Management ▪ 6 = Design ▪ 7 = Environment ▪ 8 = Financial Management ▪ 9 = Freight ▪ 10 = Geotechnical ▪ 11 = Human Resources ▪ 12 = Hydraulics ▪ 13 = Major Projects ▪ 14 = Operations ▪ 15 = Pavement & Materials ▪ 16 = Program and Management Analyst ▪ 17 = Program and Project Delivery ▪ 18 = Planning ▪ 19 = Safety ▪ 20 = Structures

Variable	Variables Operationalization Details and Definition
	▪ 12 = Structures Technical Service Team • **Do any of the members of (insert team name) have a different primary discipline than you have?** • Yes or No • **Which other primary discipline(s) are the (insert team name), select all that apply?** ▪ 1 = Administrative and Support Services ▪ 2 = Air Quality ▪ 3 = Civil Rights ▪ 4 = Communication & Marketing ▪ 5 = Construction and Project Management ▪ 6 = Design ▪ 7 = Environment ▪ 8 = Financial Management ▪ 9 = Freight ▪ 10 = Geotechnical ▪ 11 = Human Resources ▪ 12 = Hydraulics ▪ 13 = Major Projects ▪ 14 = Operations ▪ 15 = Pavement & Materials ▪ 16 = Program and Management Analyst ▪ 17 = Program and Project Delivery ▪ 18 = Planning ▪ 19 = Safety ▪ 20 = Structures • **Has your team utilized a SharePoint site for collaborative efforts (team/group discussions, team/group meetings, workgroups, team/ group training, etc.) anytime from January 2012 to the present?** • Yes or No • **Has (insert team name) utilized a SharePoint site for collaborative efforts (team/group discussions, team/group meetings, workgroups, team/ group training, etc.?) anytime from January 2012 to the present?** • Yes or No
Perceived Information Quality	The CSCW contributor's reaction to the characteristics of output information versus the user's view of the quality of the information requirements A 9-item instrument adapted and utilized from (Nicolaou & McKnight, 2006) the Perceived Information Quality scale (Scale: 1= strongly disagree; 7=strongly agree) Please answer the questions below dealing with your perception of quality of information of the SharePoint for collaboration efforts. 1. The SharePoint site provides data that is current enough to meet my business needs. (currency)

Variable	Variables Operationalization Details and Definition
	2. There are accuracy problems in the data I use or needed in this SharePoint site. (accuracy) " 3. The data maintained by the SharePoint site is pretty much what I need to carry out my tasks. (relevance) 4. The transaction data transmitted are actually processed by the SharePoint. (completeness) 5. The discipline SharePoint site maintains data at an appropriate level of detail for my purposes. (relevance) 6. The data I enter on the discipline SharePoint site can be relied upon. (reliability) 7. The data is up-to-date enough for my purposes. (currency) 8. The SharePoint site provides up-to-date information with regard to past transactions. (currency) 9. The same data I enter on the SharePoint site are the ones received by other members. (accuracy/completeness)
Perceived Risk	The specific kind of uncertainty a CSCW contributor perceives which indicates the degree of uncertainty the system user feels in the situation A 3-item instrument was adapted and utilized from (Nicolaou & McKnight, 2006) the Perceived Information Quality scale (Scale: 1= strongly disagree; 7=strongly agree) which was based on an instrument adapted from perceived risk items used by (Sitkin & Weingart, 1995), How would you characterize the usage the discipline SharePoint site offered to collaborate with your peers in terms of risk? 1. Significant opportunity/significant threat 2. Potential for gain/potential for loss 3. Positive situation/negative situation
Trusting Belief	The CSCW contributor's belief that the other contributor has beneficial characteristics and that favorable perceptions are implied within the environment An 11-item instrument was adapted and utilized from (Nicolaou & McKnight, 2006) the trusting beliefs scale (Scale: 1= strongly disagree; 7=strongly agree) Trusting Beliefs (seven-point scale, strongly agree to disagree strongly) 1. I believe that SharePoint contributor act in my best interest. 2. If I required help, the SharePoint site contributors would do its best to help me. 3. The SharePoint site is interested in my well-being, not just its own. 4. The content on the SharePoint site is truthful. 5. I would characterize the vendor as honest. 6. The SharePoint site contributors would keep its commitments. 7. The SharePoint site contributors are sincere and genuine. 8. The SharePoint site contributors are competent and effective in providing this information. 9. The SharePoint site contributors perform their role of providing the SharePoint very well. 10. Overall, the SharePoint site contributors are capable and proficient Internet SharePoint site providers. 11. In general, the SharePoint site contributors are very knowledgeable about issues of SharePoint.
Intention to Use	The CSCW contributor's self-reported Intention to Use the CSCW scale (Scale: seven-point, extremely likely, extremely unlikely) A 4-item instrument was adapted and utilized from (Nicolaou & McKnight, 2006) 1. What is the likelihood that you would continue using this SharePoint site in the future to collaborate with other discipline members similar to the ones described in your case? (dropped)

Variable	Variables Operationalization Details and Definition
	2. If I were faced with using the discipline SharePoint site in the future, 1would use it again. 3. If a similar circumstance arises in the future, I would feel comfortable using discipline SharePoint site again to collaborate with other members. 4. I would recommend use discipline SharePoint site to other discipline members who may be faced with similar collaboration needs as the one described in my case.
Demographic and Organizational Structural Information	• **What is your secondary discipline?** • 1 = Administrative and Support Services • 2 = Air Quality • 3 = Civil Rights • 4 = Communication & Marketing • 5 = Construction and Project Management • 6 = Design • 7 = Environment • 8 = Financial Management • 9 = Freight • 10 = Geotechnical • 11 = Human Resources • 12 = Hydraulics • 13 = Major Projects • 14 = Operations • 15 = Pavement & Materials • 16 = Program and Management Analyst • 17 = Program and Project Delivery • 18 = Planning • 19 = Safety • 20 = Structures This is the level of the CSCW contributor's positions in the agency. • **What is your grade** • 1 = (Grades 1–5) • 2 = (Grades 6–8) • 3 = (Grades 9-11) • 4 = (Grades 12-14) • 5 = (Grades 15 and SES) Demographics: • **To which office do you report?** • 1 = HQ • 2 = DO • 3 = FLD • 4 = OTS • **What is your gender?** • 1 = Male • 2 = Female • **What is your Geographical/Duty Office? From which office do you physically work?** (List of all 52 division office for DO, HQ for Headquarters EFLD, CFLD, WFLD for Federal Lands Divisions Offices). • 1 = Alabama • 2 = Alaska • 3 = Arkansas • Educational Level: **What is your highest level of educational achievement?** • 1 = High School • 2 = College Graduate • 3 = Master's Degree • 4 = Doctoral

Variable	Variables Operationalization Details and Definition

	• **What is your race?** Mark one or more races to indicate what you consider yourself to be.
	  • 1 = American Indian or Alaska Native
	  • 2 = Asian (e.g., Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese)
	  • 3 = Black or African American
	  • 4 = Native Hawaiian or other Pacific Islander (e.g., Samoan, Guamanian, or Chamorro)
	  • 5 = White
	  • 6 = Decline to respond
	• **Cultural Variables (Ethnicity Are you Spanish/Hispanic/Latino)**
	  • 1 = No, not Spanish/Hispanic/Latino
	  • 2 = Yes, Mexican, Mexican-American, Puerto Rican, Cuban, or other Spanish/Hispanic/Latino
	  • 3 = Decline to respond

FDSS Role	• **What role(s) do you play in your primary discipline**
	  • 1 = Member
	  • 2 = SharePoint Site Owner
	  • 3 = Discipline Committee Member
	  • 4 = Discipline Champion
	  • 5 = Discipline Council Representative
	  • 6 = Discipline Sponsor (Generally this is an AA, DFS or HQ Office Director)
	• **What role(s) do you play in your secondary discipline**
	  • 1 = Member
	  • 2 = SharePoint Site Owner
	  • 3 = Discipline Committee Member
	  • 4 = Discipline Champion
	  • 5 = Discipline Council Representative
	  • 6 = Discipline Sponsor (Generally this is an AA, DFS or HQ

Functional Diversity

The independent variable used in this study was the functional diversity of contributors. The primary discipline affiliation assessed functional diversity of contributors. Consistent with previous operationalization of measures of heterogeneity studies (Wiersema and Bantel, 1992), discipline affiliation was coded into twenty categories: (1) Administrative & Supportive Services, (2) Air Quality, (3) Civil Rights, (4) Construction & Project Management, (5) Design, (6) Environment, (7) Financial Management, (8) Freight, (9) Geotechnical, (10) Hydraulics, (11) Human Resources, (12) Major Projects, (13) Operations, (14) Pavement & Materials, (15) Planning, (16) Program & Management Analysis, (17) Program & Project Delivery, (18) Pavement & Materials, and (19) Safety, and (20) Structures.

Data were collected at the individual level (discipline member's primary affiliation) and aggregated to the team level for the functional diversity measure. A variation of the Teachman index was used to assess the level of homogeneity and heterogeneity to measure functional diversity because of its ability to consider both the number of discipline categories and the balance of distribution of teams and members among them (Nielsen, 2009).

Functional diversity was measured with the use of dummy variables. Heterogeneity was coded as one (1) if the discipline member was on a team with other discipline types and as zero (0) if the respondent's entire team was of the same discipline type (homogeneity). According to Harrison and Klein (2007), diversity can be conceptualized in three divergent ways: separation, disparity, and variety. However, for this study, the concept of disparity is not suitable because it relates to differences in power and social status such wealthy versus impoverished. Moreover, the concept of separation is not practical for this study's purpose because it measures the discrepancy between distinctive subsections such as a newly hired and long-term employee.

The most commonly used indexes in diversity research to operationalize functional diversity are Teachman's index, Blau's index, the coefficient of variation, Gini coefficient, and mean Euclidean distance. They are used to because they satisfy important statistical prerequisites for assessing group diversity. Many are used because they are easy to calculate and permit basic evaluation of effects correlated to diversity. Although the Teachman index has weaknesses as many others such as the Blau index, past research has indicated its appropriateness and reliability of the analyses required in this study (Barrick, Stewart, Neubert, & Mount, 1998; Conway & Schaller, 1998; Thomas, 1999).

To measure functional diversity with respect to functional background, the researcher used an entropy-based index recommended by Teachman (1980) see Figure 4 below. Teachman's index was used to evaluate observable, categorical diversity variables like race and gender (Bantel, 1994; Jackson, et al., 199; Teachman, 1980).

$$H = \sum_{i=1}^{D} P_i \text{Log}_2 \times (P_i)$$

Figure 5. Heterogeneity index formula.

The index is defined as H, and P_i correspondingly indicate the total number of disciplines and the fraction of team members in the discipline. The minimum value for H is equal to zero, meaning that there are no differences among group members for the attribute of interest. That is, apart from one of them, all proportions are equal to zero. According to Harrison and Klein (2007), the experiences of someone who is different from all the others in the team will be radically changed depending on the unit context

The index evaluated how individuals on a team were dispersed over the various disciplines represented in that team. The Teachman, as well as the Blau index, have been found to correlate with other measures of heterogeneity such as the coefficient of variation (CV), which is the mean of a variable divided by its standard deviation (see Bantel, 1994; Bantel & Jackson, 1989; Jackson, et al., 1991). Teachman's index varies from 0 (all group members are the same) to 1 (diversity among group members has reached a theoretical maximum) and provides a single digit to represent the level of heterogeneity based on each type of categorical diversity measured.

Thus, functional diversity was calculated for each individually identified team in the study. These indices were analyzed separately during hypothesis testing. The index was used because it takes into account how discipline members are distributed among the

potential disciplines of a variable on the team. The total number of categories of a variable equals *D* and *P* is the fraction or proportion of team members falling into discipline *i*. For example, the gender variable has two possible categories (*i*=2): 1 corresponds to a female and 2 to a male. If a given team of ten members has three women and seven men, then P_1, equals .3, P_2 equals .7, and *H* equals .61. If a team of ten members has one woman and nine men, then P_1, equals .1, P_2 equals .9, and H equals .32. As Ancona and Caldwell (1992: 328) noted, "The only exception occurs when [a category] is not represented." In such a case, one cannot set *p*, equal to zero, for the natural logarithm of zero does not exist; thus, one would only use the P_i values for the other categories to compute H.

The participants in this study were very mixed in primary discipline member affiliation. Therefore, team diversity was conceptualized as variety, which suggests potentially positive effects of functional diversity, such as enrichment of cognitive and behavioral resources. A number of questions were asked of the discipline members to identify the primary area of discipline membership, the name of the team of which they are part of, if outside of the Resource Center. The Resource Center teams were known, and the expectation of functional diversity is low. If the members are not in the Resource Center, they were asked to identify team and team composition.

However, discipline membership is not known for all employees, and some Resource Center teams have a higher level of functional diversity (by the very nature of the team's work. Examples of these teams include Safety and Highway Design (at least two disciplines), Construction and Project Management (two to four disciplines at a minimum), Environment, Planning and Operation all have a possibility of at least two to

three disciplines represented. Therefore, the survey questions, which asked how many other disciplines, were represented and the number of those disciplines were used to determine the variation in functional diversity for the frame sample. Additionally, the respondents were asked whether the team had utilized a SharePoint site. The variables were invoked within two areas of impact: the perceived risk area and the trusting belief area. The areas of impact were measured directly by using the web-based survey responses.

Perceived Information Quality, Perceived Risk, Trusting Belief and Intention to Use

The dependent variables for this study were perceived information quality; perceived risk, trusting belief, and intention to use (see Table 2 and description above). These variables were invoked in three areas. First was the level of the CSCW contributor's reaction to the characteristics of output information versus the contributor's view of the quality of the information requirements. Next was the specific kind of uncertainty a CSCW contributor perceives, which indicates the degree of risk the CSCW contributor feels in the situation. The third was the discipline member's self-reported intention to use the CSCW.

The study used a perceived information quality (PIQ) scale, with items selected from (Nicolaou & McKnight, 2006). The items represent the currency, accuracy, relevance, completeness and reliability aspects of the SharePoint site. These are often used as PIQ dimensions in the literature (Nicolaou & McKnight, 2006). This study adopted an eleven (11) item trusting beliefs scale. Three perceived risk items (1-3) were adapted from Sitkin and Weingart (1995). Nicolaou and McKnight (2006) used the

perceived risk items but added two more items as a precaution because their previous scale had the reliability of only 0.75.

After examining the TAM literature, Nicolaou and McKnight (2006) created the intention to use items 1-3 to capture expected future behavioral use and endeavored to capture more information of intention to use. Liu et a1. (2004) found that two items about recommending the website and two items about using/visiting the website again formed a cohesive construct with a Cronbach's alpha of .92. Nicolaou and McKnight (2006) tested the measurement model (measured constructs only) for convergent and discriminant validity. Each item loaded on its own construct at 0.5 or above. This indicated individual item reliability. All internal consistency reliability (ICR) coefficients met the .70 standard as well. The testing further demonstrated that all constructs met the 0.5 AVE criterion, supporting convergent validity. Additionally, the data passed all other tests of validity.

Extraneous Variables

In addition to the independent and dependent variables described above, this study addressed a number of extraneous variables (e.g. respondents' secondary discipline, grade level, the office reported to, gender, geographic location of the office, educational level, race, and ethnicity) that are related to the diversity of contributor. These variables are demographic or organizational in nature. Some of these variables are a home office and/or duty location, position level, the geographical area such state or office located, discipline role, etc. There was a possibility that some of the extraneous variables influenced the PIQ, perceived risk and trusting belief between the CSCW and the degree of contribution. It was important to consider this to ensure accurate interpretation of the

results of the study. The areas were measured directly by using the relevant responses from the web-based survey.

Ordinary least squares regression analysis was used to test the hypothesis. A web-based survey methodology was employed to assess members' behavioral attitudes, subjective norms, and perceived risk and trusting belief concerning using the CSCW. An ordinary least squares regression was used to test the hypotheses of the research model. Additionally, means and correlation coefficients were examined to address the research questions.

Table 3: Hypotheses

Hypothesis	*Validating Test(s)*
H1: In CSCW environments, perceived information quality will be higher when discipline membership is the same than when discipline membership is different.	Ordinary least squares regression
H2: In CSCW environments, perceived information quality will negatively influence the level of perceived risk.	Ordinary least squares regression
H3: In CSCW environments, Perceived information quality will positively influence the level of trusting belief.	Ordinary least squares regression
H4: In CSCW environments, perceived risk will negatively influence the intention to use a CSCW.	Ordinary least squares regression
H5: In CSCW environments, trusting belief will positively influence the intention to use a CSCW.	Ordinary least squares regression

Pilot Study

A sample of two-hundred (200) disciplines members representing twenty disciplines groups agreed to take part in a pilot study. The objective of the pilot study was to make an initial evaluation of the questionnaire's reliability and validity. Additionally, the pilot study was used to compare the operationalization of the variables of the study. Therefore, after the data were collected, the researcher to determine if it appropriately measured the data reviewed the instrument. The pilot study helped increase both the study's validity and reliability.

To test reliability and validity of the web-based survey, a small-scale preliminary study was utilized to analyze the meaning, as well as the consistency of questions. It was the researcher's expectation that the pilot study would uncover potential problems before they become costly errors in the actual study. The pilot study also provided information on how long data collection takes and how participants would react to the survey.

Validity

All endeavors of research should undergo and assessment for validity and reliability. Construct validity was tested through confirmatory factor analysis. Convergent validity exists if the construct has a high correlation with another test that measures the same construct. Convergent validity was tested by comparing the correlations of functional diversity in this study with previous studies. Divergent validity was demonstrated through a low correlation with a test that measures a different construct in this study. More specifically, in this study divergent validity were tested by examining the correlation with theoretically different constructs (e.g., perceived information quality, perceived risk and trusting belief).

This assessment process ensures that the quality of the research does not lead inadvertently to flawed results. It is vitally important to ensure questionnaires are both valid and reliable. This section discusses two critical indicators of research quality namely the validity and reliability of the data collection instruments. Validity and reliability are the conceptual research processes associated with the development of assessment instruments.

The survey questions utilized in the study were adapted from previous research that has rigorously assessed for validity and reliability. Utilizing validated survey scales and adapting from construct measures from previous research should enhance validity and reliability. Therefore, the purpose of the validity and reliability assessment in this study was undertaken to ensure the population of this study is taken into consideration of survey questions.

Validity is the degree to which the instrument measures what it was intended to measure (Creswell, 2002). More succinctly, was there a match in what this study attempted to discern and what the instrument provides. Utilizing instruments developed to measure the constructs provided an easier approach to operationalizing the variables in this study. According to Oermann and Gaberson (2009), validity was not a fixed property of the instrument, but it refers to the ways in which it allows the researcher to interpret accurately perceptual factors. This study utilized two validity elements for the development of the survey instrument. First, face validity was used by presenting the instrument to pre-test discipline subgroup (pilot study). Second to test content validity this study utilized discipline leadership (council members and discipline members) to

provide reviews of the instrument's clarity, length and to provide feedback on if the ability of the instrument to capture discipline members perceptions.

Reliability

There are a number of approaches to assessing reliability. Cronbach's alpha was used in this study to assess reliability. It is critically important in this study to understand score reliability because of the possible impact reliability has on the interpretation of research results. A test is interpretable when it has internal consistency (Cronbach, 1951). Cronbach's alpha is used to measure how closely variables in a study are related to one another.

Reliability, for the purpose of this study, was the consistency of the measurement across similar respondents and/or administration of the instrument. Simply put, the questionnaire items measured the same thing for like respondents. In other words, if respondents were asked about the same factor, all should receive similar responses. Reliability refers to the degree of consistency displayed when a measurement is repeated under identical conditions (Creswell, 2002).

Data Collection Procedures

First, all discipline members received an email invitation from the discipline sponsor of the FDSS discipline alerting them to this forthcoming survey and prompting them to participate. Second, members of individual disciplines received an invitation from their discipline champions to take part in the survey in a formal discipline meeting. Lastly, members of the FHWA discipline council were briefed on the study and were asked to promote the study in their regularly scheduled with discipline leadership.

Twenty (20) of FHWA's disciplines, which are identified in Table 4 were the focus of this study. The discipline members were FHWA federal employees employed to perform daily work, which requires core competencies' skill set identified by discipline leadership as critical for performing daily work in positions covered under the discipline support system framework.

Table 4: FHWA Disciplines

Federal Highway Administration Disciplines	
(1) Air Quality	(11) Human Resources
(2) Administrative & Supportive Services	(12) Major Projects
(3) Civil Rights	(13) Operations
(4) Construction & Project Management	(14) Pavement & Materials
(5) Design	(15) Planning
(6) Environment	(16) Program & Management Analyst
(7) Financial Management	(17) Program & Project Delivery
(8) Freight	(18) Pavement & Materials
(9) Geotechnical	(19) Safety
(10) Hydraulics	(20) Structures

The data was collected utilizing a randomly sampled approach. Additionally, data was collected from all salary levels, positions, and diversity of background. As part of this study, data was collected from a web-based survey of Federal Highway Administration (FHWA) employees. The data was collected from members of the organizations FDSS. The data analysis was expected to reveal evidence that the relationship between the functional diversity of contributors, the perception of the quality of information, the level of perceived risk, trusting belief and intention to use a CSCW is systematically measurable.

Data Analysis

Data collected during this study was used to measure functional diversity and its impact on the level of perceived information quality. This study utilized an ordinary least squares regression to test hypotheses 1 through 5.

This study relied upon certain assumptions about the variables used in the analysis. If these assumptions were not met, then the results of the study may not be trustworthy, resulting in Type I or Type II errors or an erroneous assessment of significance or effect size. The next few paragraphs will discuss the assumptions of regression within this study (i.e. normality of distribution, linearity, the reliability of measurement, and homoscedasticity). The first assumption of regression of this study was that none are in violation of normal distribution. One regression assumption in this study was that variables have a normal distribution. Variables that are not normally distributed (e.g. variables with substantial outliers or which are highly skewed such as being weak or flat relative to a normal distribution) can misrepresent relationships and significance tests, and others are fulfilled by the proper design of a study (e.g., independence of observations).

Next assumption of regression is this study is that the relationship between the dependent and independent variables are linear. The assumption is the expected value of the dependent variable in the study is a function of each independent variable and that the slope of the line does not depend on the value of other variables. If the relationships between independent variables and the dependent variable were not linear, the results of the regression analysis would capture the accurate correlation. To detect non-linearity,

this study utilized plots of the standardized residuals as a function of standardized predicted values.

Another assumption of regression in this study was that variables measure reliably and without error (reliability of measurement). Untrustworthy measurement can cause miscalculation of relationships, which increases the possibility of Type II errors.

Finally, the assumption that the variance of errors is the same at all levels of the independent variable (homoscedasticity). In this study, homoscedasticity was checked by graphic production and inspection of a plot of the standardized the errors by the regression standardized expected value. The SPSS statistical package was used for data analysis. To ensure confidentiality, responses were reported in an aggregate format. Descriptive statistics were used to describe the collected data, and inferential statistical techniques were used to answer the research questions.

The tools that were needed to complete this study include a laptop computer, telephone, web survey tool, online survey development tools, and word processing software. In addition, this study required handbooks on statistical analysis and the SPSS statistical package software to analyze the data. Additionally, this study required access to the users of collaborative work environments at the Federal Highway Administration. Data for the questionnaire was collected, and data were analyzed with the SPSS statistical analysis package.

Chapter 4

Results

Introduction

The purpose of this study was to determine how the functional diversity of the participants within a collaborative work system environment affects the formation of perceived information quality, which in turn influences trusting belief and perceived risk influences the intent to use a CSCW. This chapter presents the results of the research performed in this study. It provides a review of the analysis performed to test the hypotheses encapsulated in the model. The data collected were then analyzed, following the process recommended by Hair et al. (2014).

Data Analysis Description

Following the pilot study, the full study was initiated. The study utilized the same procedure for soliciting respondents. 2372 invitations were sent to the discipline members. Six hundred sixty-five responded, and 248 of those were fully completed the survey with useful data. Although this is not high response rate, there were sufficient responses for the purposes of this study. Data were collected for three weeks only and just prior to the winter holidays, which may have, accounted for low responses. Further discussion on response rate is found in the limitation of study section in Chapter5 of this report. Data collected during this study measured functional diversity and its impact on the level of perceived information quality. Data analysis included a multivariate linear regression, which was used to test hypotheses 2 through 5. An independent sample t-test and a multivariate linear regression analysis were used to test Hypothesis 1. The functional diversity variable was dummy coded such that 0 = all group members are the

same and 1 = some degree of heterogeneity among group members. Office location was dummy coded to reflect two levels (0 = HQ, 1 = Field) and pay grade was dummy coded to reflect two grips (0 = grades GS/1- GS/11, 1 = grades GS/12 – SES).

Assumptions of Regression

The next few paragraphs will discuss the assumptions of regression within this study (i.e. normality of distribution, linearity, the reliability of measurement, and homoscedasticity). The first assumption of regression of this study was that none were in violation of normal distribution. Variables that are not normally distributed (e.g. variables with substantial outliers or which are highly skewed such as being weak or flat relative to a normal distribution) can misrepresent relationships and significance tests, and others are fulfilled in the proper design of a study (e.g., independence of observations).

Next assumption of regression for this study was that the relationship between the dependent and independent variables are linear. The assumption is the expected value of the dependent variable in the study is a function of each independent variable and that the slope of the line does not depend on the value of other variables. If the relationships between independent variables and the dependent variable are not linear, the results of the regression analysis will not capture the accurate correlation. To detect non-linearity, this study utilized plots of the standardized residuals as a function of standardized predicted values.

Another assumption of regression in this study was that variables measured reliably and without error (reliability of measurement). Unreliable measurement can cause miscalculation of relationships, which increases the possibility of Type II errors. Finally, the assumption that the variances of errors were the same at all levels of the

independent variable (homoscedasticity). In this study, homoscedasticity was confirmed by graphic production and inspection of a plot of the standardized the errors by the regression standardized expected value. An appropriate statistical package was used for data analysis. To ensure confidentiality, responses were reported in an aggregate format. Descriptive statistics were used to describe the collected data, and inferential statistical techniques were used to answer the research questions.

Participants

The participant demographics are presented in Table 5. The majority were male (*n* = 131, 52.8%) and White (*n* = 141, 56.9%). Forty-four percent (*n* = 109) indicated they were college graduates and 37.5% (*n* = 93) had a Master's degree. Pay grade varied, but the majority were between grades 12-14 (*n* = 183, 73.8%). Less than half indicated that there were other disciplines on the team (*n* = 107, 43.1%). More than 50% (*n* = 141, 56.9%) indicate there was no diversity

Table 5: Frequencies and Percentages for Participants' Characteristics

Variable	*N*	%
Gender		
Male	131	52.8
Female	83	33.5
Decline to Respond	34	13.7
Total	248	100.0
Race		
American Indian or Alaska Native	8	3.2
Asian	7	2.8
Black	23	9.3
Native Hawaiian or other Pacific Islander	1	.4
White	141	56.9
Decline to Respond	68	27.4
Total	248	100.0
Education		
High School	14	5.6
College Graduate	109	44.0
Master's Degree	93	37.5
Doctoral	8	3.2
Decline to respond	24	9.7
Total	248	100.0
Pay Grade		
Grades 1–5	1	.4
Grades 6–8	23	9.3
Grades 9-11	13	5.2
Grades 12-14	183	73.8
Grades 15 and SES	14	5.6
Decline to respond	14	5.7
Total	248	100.0
Office reported to		
HQ	68	27.4
DO	80	32.3
FLD	59	23.8
OTS	41	16.5
Total	248	100.0
Are there other disciplines on the team		
No	137	55.2
Yes	111	44.8
Total	248	100.0
Team Diversity		
No Team Diversity	141	56.9
Diversity Within the Team	107	43.1
Total	248	100.0

Assessment of Normality

To assess the normal distribution of the sample data, the Kolmogorov-Smirnov test was used (see Table 6). Based on the results, Intention to Use was not normally distributed (p = .00). Perceived Information Quality was normally distributed (p = .01). Perceived Risk was not normally distributed (p = .00). Trusting Belief was not normally distributed (p = .001).

Table 6: Kolmogorov-Smirnov Test Sample Data Normal Distribution

Variable	Statistic	*df*	Sig.
Intention to Use	.178	248	.00
Perceived information Quality	.065	248	.01
Perceived Risk	.177	248	.00
Trusting Belief	.105	248	.001

To assess the normal distribution of the data by gender, the Kolmogorov-Smirnov test was used (see Table 7). Based on the results, Intention to Use was not normally distributed for males (p = .00) or females (p = .00). Perceived Information Quality was normally distributed for males (p = .20) and females (p = .20). Perceived Risk was not normally distributed for males (p = .00) or females (p = .001). Trusting Belief was not normally distributed for males (p = .001) or females (p = .01).

Table 7: Kolmogorov-Smirnov Test for Gender

Variable	Gender	Statistic	*df*	Sig.
Intention to Use	Male	.188	131	.00
	Female	.174	82	.00
Perceived information Quality	Male	.066	131	.20
	Female	.083	82	.20
Perceived Risk	Male	.192	131	.00
	Female	.172	82	.00
Trusting Belief	Male	.106	131	.001
	Female	.114	82	.01

Log Transformation Non-Normal Data

Several of the predictor variables failed to meet strict criteria for normality of distribution. For these variables, appropriate transformations were made to normalize the variables and models were re-tested with the transformed data. The results based on the transformed data mirrored are based on the raw data in both patterns of associations accounted for variances. The researcher performed variable transformation when necessary to obtain a normal distribution. Normality and homogeneity of the variance of the residuals were examined using skewness, kurtosis, histograms and Q-Q-plots using SPSS. These demonstrated approximation of normal distribution after transformations.

Log transforms were utilized to approximate normal distribution for a parametric test of the hypotheses. Through a process of trial and error, a more normal distribution was achieved by applying a Log10 transformation to these data. The researcher performed variable transformation when necessary to obtain a normal distribution.

Normality and homogeneity of the variance of the residuals were examined using skewness, kurtosis, histograms and Q-Q-plots using SPSS. These demonstrated approximation of normal distribution after transformations.

Assessment of Common Method Bias

Common method variance, which refers to the variance that is attributable to the measurement method used rather than to the constructs the measures represent (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), was assessed by using Harman's single factor test and confirmatory factor analysis. One general factor accounted for the majority of the covariance among the variables. Thus, a substantial amount of common method variance is not present. The one-factor model accounted for 62.98% of the variance. The Component Matrix in Table 11 shows that 24 items representing Perceived Information Quality, Trust Belief, and Intention to Use were extracted as part of the factor. The results of the factor analysis show that there is one significant component, which is accounted for by all the variables used in the model.

Reliability

The reliability of the scales was measured by using Cronbach's alpha. Cronbach's alpha by and large increases when the correlation between items increase. The coefficient is called internal consistency or internal consistency reliability test. The study only selected variables that had the coefficient consistency to determine the accuracy of the findings. An assurance of reliability requires an internal consistency of 0.70 or lower be selected for further analysis. In this study, there were no items below 0.70, and thus none were removed from the data. The final survey questionnaire selected 248 responses from the discipline members. The statistical analysis generated from the SPSS data enabled the

study to answer all the research questions. The scales Cronbach's alphas ranged from ranging from .87 to .96. All the scales were reliable and thus had internal consistency.

Table 8: Cronbach's Alphas for the Composite Scales

Scale	Cronbach's Alpha	# of Items
Perceived Information Quality (PIQ)	.94	9
Perceived Risk	.87	3
Trusting Belief	.97	11
Intention to Use	.96	4

Validity Tests

The study utilized several procedures during the data analysis. First, to test for construct validity, the researcher selected factor analysis to analyze the data. Factor analysis can be used to identify the underlying component factors between the measured variables and the latent constructs. It also provided confirmation of convergent validity. Convergent validity exists when constructs that are expected to be related are, in fact, actually related. The stages of the factor analytical procedures encompassed evaluating the appropriateness of utilizing factor analysis, correlation matrices, factor extraction, choosing the number of factors to retain, factor rotation, component score coefficient matrix, and factor interpretation (Hui, Jian-Shi, Xiong, Peng, Da-Ling, 2007). Secondly, the discriminant validity of the construct was tested.

Convergent Validity

A factor analysis was conducted to determine if the items for the scales had convergent validity. An exploratory confirmatory factor analysis using Varimax rotation with Kaiser-Meyer-Olkin Measure of Sampling Adequacy. Bartlett's Test of Sphericity was performed. As seen in Tables 9 -12, the construct items, loaded most highly on their

own factors. Convergent validity means how well each construct captures the variance in its measures. Convergent validity can be assessed a number of ways such as by inspecting individual item reliability (standard: 0.5 or above), composite construct reliability (similar to Cronbach's alpha-standard: 0.7 or above), or average variance extracted (AVE), which measures whether the variance the construct captures exceeds the variance due to measurement error (standard: 0.5 or above) (Fornell and Larcker 1981). The researcher assessed by item reliability. In this study. Individually each item loaded on its own construct at 0.5 or above, indicating individual item reliability, supporting convergent validity.

Table 9: Component Matrix Perceived Information Quality

Items	Component 1
PIQ7	.895
PIQ3	.875
PIQ5	.866
PIQ1	.857
PIQ6	.843
PIQ8	.841
PIQ9	.805
PIQ2	.786
PIQ4	.721

Table 10: Component Matrix Intention to Use

Items	Component 1
INT1	.949
INT2	.965
INT3	.960
INT4	.953

Table 11: Component Matrix Trusting Belief

Items	Component
	1
TB1	.864
TB2	.858
TB3	.892
TB4	.905
TB5	.919
TB6	.914
TB7	.924
TB8	.921
TB9	.897
TB10	.887
TB11	.866

Table 12: Component Matrix Perceived Risk

Items	Component
	1
PR1	.904
PR2	.896
PR3	.886

Convergent validity was assessed by correlating the PIQ, Perceived Risk, Trusting Belief, and intention to Use items with one another. The PIQ items were highly correlated with one another with correlations ranging from .51 to .79. The Trusting Belief items were highly correlated with one another with correlations ranging from .68 to .90. The Perceived Risk items were highly correlated with one another with correlations ranging from .68 to .72. The Intention to Use items was highly correlated with one another; correlations for these items ranged from .86 to .91. The smallest within-factor

correlations are PIQ: 0.540 and p = 0.000; Trusting Belief = 0.689 and p = 0.00; Perceived Risk = 0.683 and p = 0.00; Intention to use = 0.867 and p = 0.00. These correlations are significantly different from zero, and hence convergent validity is established.

Discriminant Validity

A factor analysis was conducted to determine if the items for the scales had discriminant validity. An exploratory confirmatory factor analysis using Varimax rotation with Kaiser was performed. Discriminant validity (or divergent validity) exists if constructs that should have no relationship do, in fact, not have any relationship. The researcher assessed discriminant validity by examining the extent to which each measured construct has higher loadings on the indicators in its own block than indicators in other blocks (Chin 1998).

As seen in Table 13 the PIQ items, the Perceived Risk items, the Trusting Belief Items and the Intention to Use Items loaded mostly highly on different factors. The Trusting Belief Items loaded most highly on Factor 1; the PIQ items loaded most highly on Factor 2; the Intention to Use Items loaded most highly on Factor 3 and the Perceived Risk Items loaded most highly on Factor 4. In the context of this study, the researcher has established validity with evidence supporting the conclusion that the scores from the instrument utilized are a valid assessment of a discipline member's collaborative preference in a CSCW environment. The researcher has confidence when adding similar items up for total scores to represent the different dimensions of the discipline member's intention to use or continue to use the collaborative tool. This kind of validity is called internal structure evidence since it implies the scaled items assemble in an expected way.

Table 13: Rotated Factor Analysis Matrix (Discriminant)

Items	Factor 1	Factor 2	Factor 3	Factor 4
TB1	**.860**	.656	.586	.420
TB2	**.858**	.604	.550	.421
TB3	**.893**	.599	.574	.433
TB4	**.906**	.660	.514	.482
TB5	**.926**	.606	.462	.440
TB6	**.913**	.651	.535	.504
TB7	**.932**	.587	.476	.414
TB8	**.920**	.679	.473	.526
TB9	**.887**	.721	.525	.570
TB10	**.880**	.688	.457	.544
TB11	**.864**	.631	.484	.465
PIQ1	.609	**.854**	.564	.504
PIQ2	.543	**.790**	.484	.361
PIQ3	.628	**.875**	.522	.621
PIQ4	.512	**.726**	.466	.315
PIQ5	.611	**.866**	.499	.586
PIQ6	.632	**.835**	.574	.410
PIQ7	.586	**.898**	.506	.543
PIQ8	.655	**.838**	.448	.532
PIQ9	.613	**.798**	.524	.390
INT1	.565	.622	**.941**	.643
INT2	.595	.590	**.954**	.640
INT3	.577	.624	**.948**	.644
INT4	.540	.620	**.937**	.616
PR1	-.477	-.502	-.568	**-.897**
PR2	-.473	-.467	-.613	**-.880**
PR3	-.456	-.544	-.633	**-.846**

Table 14: Descriptive Statistics

Descriptive Statistics	Mean	Std. Deviation	Analysis N
PIQ1	4.86	1.475	248
PIQ2	4.62	1.512	248
PIQ3	4.53	1.550	248
PIQ4	4.35	1.254	248
PIQ5	4.65	1.527	248
PIQ6	4.96	1.434	248
PIQ7	4.57	1.562	248
PIQ8	4.67	1.409	248
PIQ9	4.99	1.282	248
PR1	2.79	1.172	248
PR2	2.48	1.256	248
PR3	2.52	1.347	248
TB1	5.11	1.307	248
TB2	5.10	1.374	248
TB3	4.96	1.326	248
TB4	5.26	1.230	248
TB5	5.32	1.200	248
TB6	5.02	1.280	248
TB7	5.31	1.208	248
TB8	5.17	1.260	248
TB9	4.96	1.262	248
TB10	5.01	1.235	248
TB11	5.13	1.279	248
INT1	5.25	1.468	248
INT2	5.37	1.391	248
INT3	5.28	1.400	248
INT4	5.13	1.580	248

The maximum likelihood estimation procedure was used to extract the factors from the data. Kaiser's rule was used to determine which factors were most eligible for interpretation because this rule requires that a given factor is capable of explaining at least the equivalent of one variable's variance. Hence, the researcher extracted four factors (see Table 15). Together they explained 79.057% all the variances.

Table 15: Variances Explained

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Squared Loadings[a]
	Total	Var. %	Cum. %	Total	% Variance	Cum %	Total
1	16.222	60.082	60.082	16.222	60.082	60.082	14.008
2	2.478	9.179	69.261	2.478	9.179	69.261	13.093
3	1.734	6.421	75.682	1.734	6.421	75.682	9.933
4	.911	3.375	79.057	.911	3.375	79.057	8.529
5	.613	2.269	81.326				
6	.546	2.021	83.347				
7	.510	1.888	85.235				
8	.458	1.697	86.932				
9	.371	1.375	88.307				
10	.342	1.265	89.573				
11	.320	1.187	90.760				
12	.300	1.113	91.872				
13	.267	.988	92.860				
14	.230	.852	93.712				
15	.201	.744	94.456				
16	.199	.737	95.193				
17	.186	.688	95.881				
18	.178	.660	96.541				
19	.161	.596	97.138				
20	.149	.551	97.689				
21	.129	.479	98.168				
22	.113	.420	98.588				
23	.100	.372	98.960				
24	.094	.349	99.309				
25	.068	.252	99.560				
26	.062	.231	99.791				
27	.056	.209	100.000				

Extraction Method: Principal Component Analysis.

a. When components are correlated, sums of squared loadings cannot be added to obtain a total variance.

Results for H1

To test the hypothesis that in CSCW environment, PIQ will be higher when discipline membership is the same than when discipline membership is diversified, and thus an independent t-test was performed. The diverse team and non-diverse team distributions were sufficiently normal for conducting a t-test. Additionally, the assumption of homogeneity of variances was tested and satisfied via Levene's *F*-test, $t(246) = -.98$, $p = .327$.

The teams with no diversity (N = 141) was associated with perceived information quality $M = 4.6249$ ($SD = 1.24952$). By comparison, the teams with diversity ($N = 107$) was associated with no significant scores for perceived information quality $M = 4.7767$ ($SD = 1.14797$). The independent sample t-test was not associated with a statistically significant effect, $t(246) = -.99$, $p = .322$. Thus, the diverse teams were not associated with a statistically significant larger effect. These results suggested that functional diversity does not have an effect on perceived information quality in a CSCW. Specifically, whether a team is diverse or not, in a CSCW the perception of information quality is not influenced.

Table 16: Correlations for Functional Diversity and Perceived Information Quality

Functional Diversity (2 Groups)	*N*	Mean	Std. Deviation	Std. Error Mean
No Team Diversity	141	4.6249	1.24952	.10523
Diversity Within the Team	107	4.7767	1.14797	.11098

Table 17: Correlations of Levene's Test for Equality of Variances of Team Diversity

	Levene's Test for Equality of Variances		*t*-test for Equality of Means		
	F	Sig.	*t*	*df*	Sig. (2-tailed)
Equal variances assumed	.804	.371	-.981	246	.327
Equal variances not assumed			-.993	237.146	.322

The correlations between the main variables for hypothesis 1 appear in Table 12. Gender was significantly and negatively correlated with Pay grade (r = -.42, p = .001). There were no other statistically significant correlations.

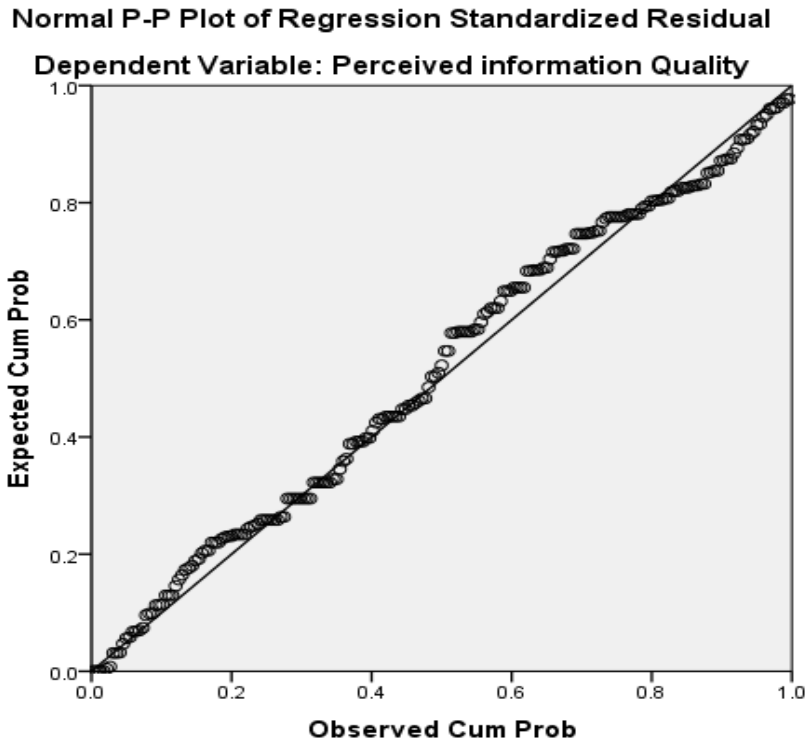
Table 18: Correlations for Functional Diversity, and Perceived Information Quality

		PIQ	FD	Gender	Pay Grade
Perceived information Quality	*r*	1	.05	.06	-.07
	p		.23	.16	.14
Functional Diversity (2 Groups)	*r*		1	-.10	-.03
	p			.067	.28
Gender	*r*			1	-.42
	p				.001*
Pay Grade (2 groups)	*r*				1
	p				

Note. * indicates the correlation is significant at the .01 level

Regression analysis was conducted to examine whether pay grade, functional diversity, and gender predicted Perceived Information Quality (criterion variable). A visualization of the P P-plot shows that the response variable, Perceived Information

Quality, approximately follows a normal distribution so meets the assumption of regression analysis (see Figure 6).



Based on the results of the multivariate regression, only 1% (R^2 = .010) of the variability in Perceived Information Quality is accounted for by Gender, Pay Grade (2 groups) and Functional Diversity (2 Groups). The model as a whole was not statistically significant, $F(3, 209) = 0.68$, $p = .56$. As can be seen in Table 15, none of the independent variables in the model was a statistically significant predictor of Perceived Information Quality.

Figure 6. Normal P P-Plot for perceived information quality.

Functional Diversity was not a statistically significant predictor of Perceived Information Quality when the effects of Pay Grade and Gender were held constant (B = 0.13, p = .43). Gender was not a statistically significant predictor of Perceived Information Quality when the effects of Pay Grade and Functional Diversity were held

constant (B = 0.12, p = .50). Pay Grade was not a statistically significant predictor of Perceived Information Quality when the effects of Gender and Functional Diversity were held constant (B = -0.15, p = .52).

Table 19: Regression: of Functional Diversity and Perceived Information Quality

Model	*B*	Std. Error	*β*	*t*	*p*
Functional Diversity (2 Groups)	0.13	.16	.05	0.78	.43
Gender	0.12	.18	.05	0.66	.50
Pay Grade (2 Groups)	-0.15	.23	-.04	0-.64	.52

Given these findings, the hypothesis that "In CSCW environments, perceived information quality will be higher when discipline membership is the same than when discipline membership is different" was not supported.

Results for H2

A regression analysis was conducted to examine whether Gender, Pay Grade (2 groups) and Perceived Information Quality predicted Perceived Risk (criterion variable). A visualization of the P P-plot shows that the response variable, Perceived Information Quality, approximately follows a normal distribution so meets the assumption of regression analysis (see Figure 7). Based on the results of the multivariate regression, 29.6% (R^2 = .296) of the variability in Perceived Risk is accounted for by Perceived information Quality, Gender, and Pay Grade (2 groups).

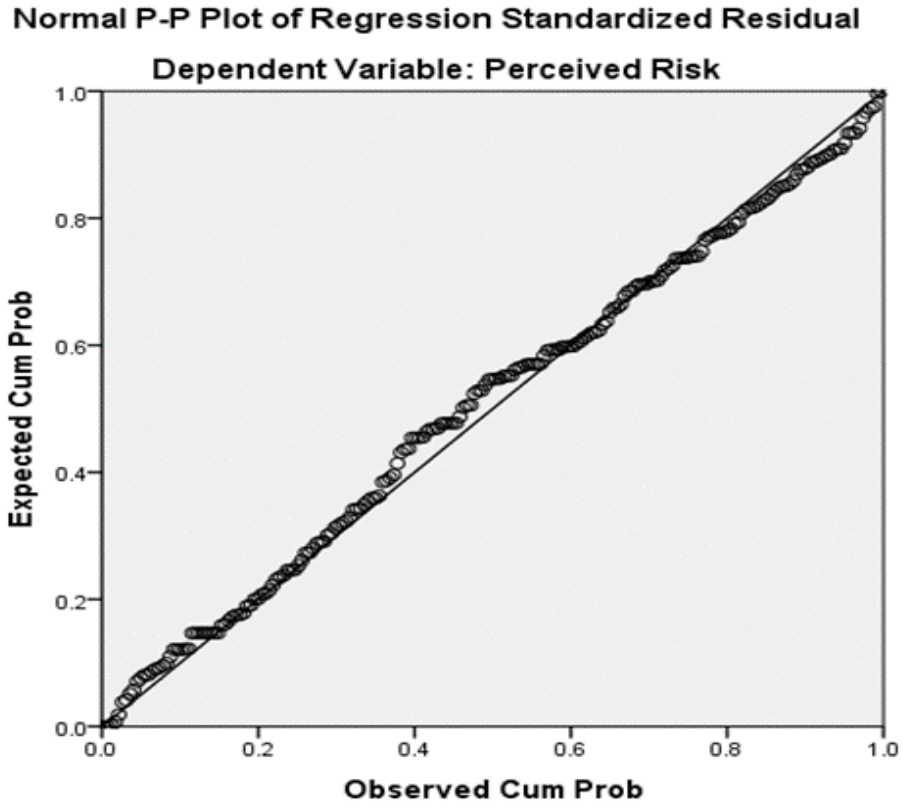


Figure 7. Normal P P-Plot for perceived risk.

The model as a whole was statistically significant, $F(3, 209) = 29.32$, $p = .001$. As can be seen in Table 16, Perceived Information Quality was a negative and statistically significant predictor of Perceived risk ($B = -0.48$, $p = .001$). Gender was a negative and statistically significant predictor of Perceived Risk when the effects of Pay Grade and Perceived Information Quality were held constant ($B = -0.32$, $p = .03$). Pay Grade was not a statistically significant predictor of Perceived Risk when the effects of Gender and Perceived Information Quality were held constant ($B = -0.21$, $p = .26$).

Table 20: Regression between Perceived Information Quality and Perceived Risk

Model	*B*	Std. Error	*β*	*t*	*p*
Perceived Information Quality	-0.48	.05	-.52	9.00	.001
Gender	-0.32	.14	-.14	2.23	.027
Pay Grade (2 Groups)	-0.21	.18	-.07	1.14	.256

Given these findings, the hypothesis that in CSCW environments, perceived information quality will negatively influence the level of perceived risk was supported. Perceived Information Quality negatively influenced the level of perceived risk.

Results for H3

A regression analysis was conducted to examine whether gender, Pay Grade (2 groups), and Perceived Information Quality predicted Trusting Belief (criterion variable). A visualization of the P P-plot shows that the response variable, Trusting Belief, approximately follows a normal distribution so meets the assumption of regression analysis (see Figure 8).

Based on the results of the multivariate regression, 55% (R^2 = .543) of the variability in Trusting Belief is accounted for by Perceived information Quality, Gender, and Pay Grade (2 groups). The model as a whole was statistically significant, $F(3, 209) = 84.96$, $p = .001$.

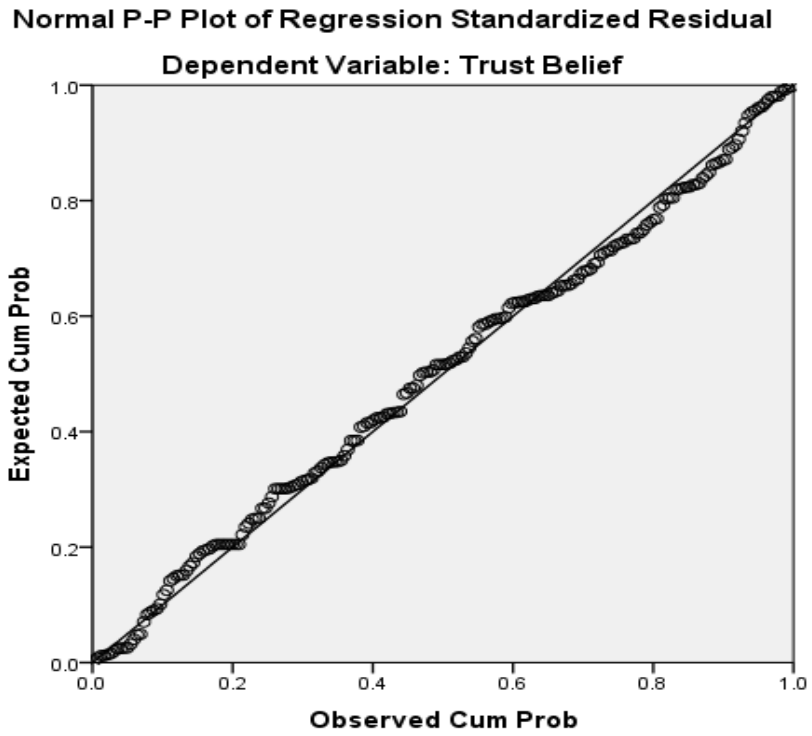


Figure 8. Normal P P-Plot for trust belief.

As can be seen in Table 17, Perceived Information Quality was a positive and statistically significant predictor of Trusting Belief (B = 0.71, p = .001). Pay Grade was a positive statistically significant predictor of Trusting Belief when the effects of Gender, Functional Diversity and Perceived Information Quality were held constant (B = 0.41, p = .008). Gender was not a statistically significant predictor of Trusting Belief when the effects of Pay Grade and Perceived Information Quality were held constant (B = 0.18, p =.14). Given these findings, the hypothesis that in CSCW environments, Perceived Information Quality will positively influence the level of trusting belief was supported.

Table 21: Regression: between Perceived Information Quality and Trusting Belief

Model	*B*	Std. Error	*β*	*t*	*p*
Perceived information Quality	0.71	.05	.73	15.78	.001
Gender	0.17	.12	.08	1.48	.14
Pay Grade (2 Groups)	0.41	.15	.14	2.67	.008

Results for H4/H5

A regression analysis was conducted to examine whether gender, Pay Grade (2 groups), and Perceived Risk predicted Intention to Use (criterion variable). A visualization of the P P-plot shows that the response variable, Intention to Use, approximately follows a normal distribution so meets the assumption of regression analysis (see Figure 9).

Based on the results of the regression analysis, 55.5% (R^2 = .555) of the variability in Intention to Use is accounted for by Perceived information Quality, Trusting Belief, Gender, and Pay Grade (2 groups). The model as a whole was statistically significant, $F(4, 208) = 64.73$, $p = .001$. As can be seen in Table 18, Perceived Risk was a negative and statistically significant predictor of Intention to Use ($B = 0.63$, $p = .001$).

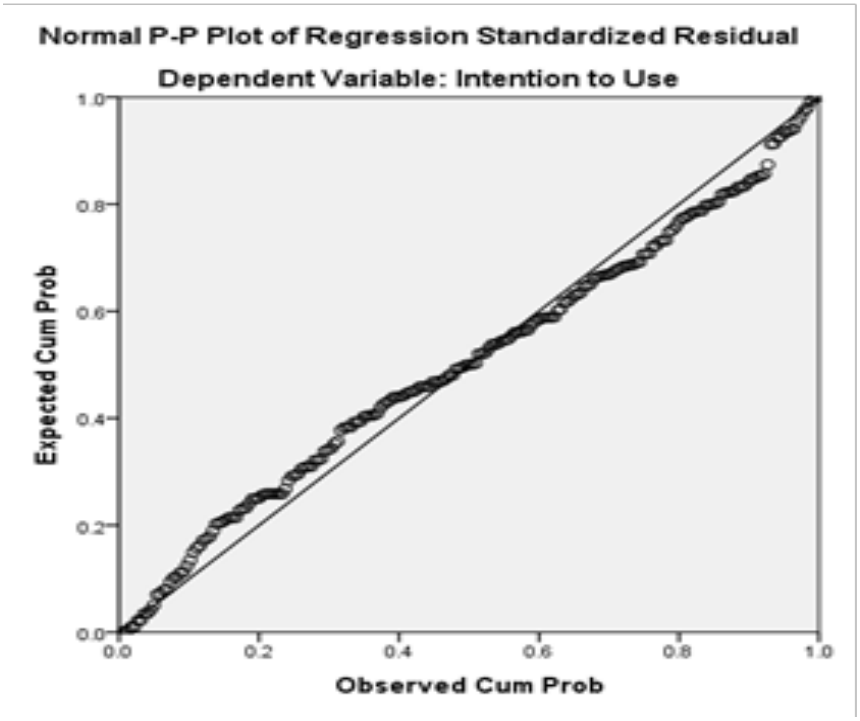


Figure 9. Normal P P-Plot for intention to use.

Trusting Belief was a positive statistically and significant predictor of Intention to Use (B = 0.35, p = .001) when the effects of Gender, Perceived Information Quality, and Pay Grade were held constant. Pay Grade was a negative and statistically significant predictor of Intention to Use (B = -0.29, p = .094). Gender (B = -0.18, p = .19) was not a statistically significant predictor of Intention to Use.

Table 22: Regression between Perceived Information Quality, Trusting Belief, and Intention to Use

Model	*B*	Std. Error	*β*	*t*	*p*
Perceived Risk	-.634	.063	-.541	-10.074	.001
Trust Belief	.356	.060	.316	5.924	.001
Gender	-.177	.136	-.067	-1.303	.194
Pay Grade (2 groups)	-.291	.173	-.086	-1.683	.056

Given these findings, the hypothesis that in CSCW environments, Perceived Risk will negatively influence the intention to use a CSCW was accepted. Also, the hypothesis that in CSCW environments, Trusting Belief will negatively influence the intention to use a CSCW was not accepted. Perceived Risk was a negative predictor in the regression model, and Trusting Belief was a positive predictor in the regression model.

Summary

This chapter began by stating the five research questions defined in previous chapters. A web-based survey, designed to capture data based on the research questions, was then administered to 665 participants. The information was checked for missing data and other irregularities, after which the demographics of the sample population were described. Before analysis, the data was screened for outliers, normality, linearity, and multicollinearity, resulting in a net of 248 total usable cases.

The analysis was then performed, including a check for internal consistency using Cronbach's Alpha. After the factor analysis had been performed, the data was tested for reliability and validity. After satisfactory reliability and validity measures, the five hypotheses derived from the five research questions were tested using ordinary least squares regression. The results from the hypotheses testing revealed that Hypothesis 1 (H1) was not supported. Hypothesis 4 (H4) which predicted a negative influence on intention to use was negative which supported the researcher's hypothesis. Hypotheses (H2, H3, and H5) were also supported.

This chapter presented the results of research investigating the relationship between functional diversity of contributors and perceived information quality, perceived information quality, and perceived risk and trusting belief and perceived risk and

perceived information quality, with the intention to use a CSCW. The results of a Web-based survey were analyzed in this chapter. Support was found four of the five hypotheses. No support was found for Hypothesis 1.

Chapter 5

Conclusions, Implications, Limitations, Recommendations and Summary

Introduction

Chapters 1 through 4 identified the research questions, defined the scope of the variables and justified the hypotheses to be tested. The purpose of this chapter is to offer an overview of the study, findings and results and a discussion on how the study contributes to the body of knowledge. The purpose of this study was to investigate whether the users' perceived information quality of the shared information is impacted by the functional diversity of the team within the collaborative work environment. Additionally, the purpose of this study was to address the research questions of how the functional diversity of contributors, within functionally diverse discipline teams, influence perceived information quality, which in turn influences the trusting belief, perceived risk and intention to use a computer supported collaborative work environment (CSCW).

This chapter consists of four sections. The first section of this chapter presents a discussion of results drawn from the data analysis. The second section presents a discussion of the implications of both significant and non-significant findings. Next, the limitations of this research and recommendations for future study are provided. Lastly, a summary of this chapter is provided. An analysis of responses from 248 discipline members of a federal agency had five key findings. Summary of these findings is discussed below.

Based on the results presented in the previous chapter, the researcher concluded that functional diversity of contributors in a CSCW does not impact the degree of

perceived information quality. Specifically, within the CSCW, members of teams that were comprised of individuals of the same discipline group showed no significant difference in the level of perceived information quality than those of teams comprised of members of divergent discipline groups.

This study utilized a quantitative approach to investigate and attempt to reveal how and why might the composition of discipline members on a team using a CSCW impact the level of perceived information quality. Information gathered from a survey were used to perform regression analyses to determine the impact of functional diversity on perceived information quality in a CSCW and whether the use or intention to use a CSCW was impacted by discipline members perceived risk and trusting belief. The literature provided information which informed the development of the hypotheses of the study. While carrying out the literature review, the researcher recognized a gap in the literature, i.e. the effects of the functional diversity on the perceived information quality (Maltz, 2014). Additionally, a number of existing studies have empirically supported the role of culture in technology adoption use. For example, Straub, Keil, and Brenner (1997) posited that technology acceptance model's dimensions such as perceived usefulness and ease of use differed across cultures. Based on these findings, the researcher posited that functional diversity might have a similar impact with regard to technology acceptance.

Summary of Findings of the Influence of Functional Diversity of Contributors Perceived Information Quality

Research Question 1 was: How does the functional diversity of contributors influence perceived information quality? The first hypothesis (H1) stated that within CSCW environments, perceived information quality would be higher when discipline

membership is the same than when discipline membership is different. The causal relation was tested as detailed in Chapter 4 between the functional diversity of contributors and perceived information quality. Functional Diversity did not emerge as a statistically significant predictor of PIQ.

The results of this research do not support the findings of previous studies, which suggested that the degree of functional diversity might influence collaborative practices (e.g. Maltz, 2014; Bunderson & Boumgarden, 2010; Willem & Buelens, 2009). In fact, Willem & Buelens (2009) found that divergence in functional knowledge complexity led to less satisfaction with knowledge sharing. However, this study found that the functional diversity of contributors within the CSCW was not significantly causal or influential to the level of perceived information quality.

However, the results of this study revealed that there is no statistically significant difference in PIQ by functional diversity groups, by gender, or by pay grade. H1 failed to reject the null hypothesis ($\beta = .05$, $p > .1$, not supported). The literature review revealed that the relationship between functional diversity of contributors and perceived information quality is a complex one that has been the subject of research in the past. Functional diversity of disciplines influences judgment or acceptance of new information (Rieh & Belkin, 1998; Wiersema & Bantel, 1992). However, in this study, the teams with no diversity as compared with the teams with diversity exhibited no varying statistically significant results for perceived information quality. Thus, the diverse teams were not associated with a statistically significant larger effect. These results suggested that functional diversity does not have an effect on perceived information quality in a CSCW. Specifically, whether a team is diverse or not, in a CSCW the perception of information

quality is not influenced. Succinctly stated, discipline members in this study were not significantly impacted by being on a homogenous or heterogeneous team concerning the assessment of perceived information quality within the CSCW.

Summary of Findings of the Impact of PIQ on Perceived Risk

Research Question 2 was how does perceived information quality impact perceived risk? The second hypothesis (H2) stated that in CSCW environments, Perceived Information Quality would positively influence the level of perceived risk. The hypothesis was tested with Ordinary multivariate regression. The results showed that Perceived Information Quality was a negative and statistically significant predictor of Perceived Risk. The researcher's hypothesis that in CSCW environments, Perceived Information Quality will negatively influence the level of perceived risk was accepted (β = .57, $p < .001$, supported). These findings support the researcher's hypothesis that in CSCW environments, perceived information quality will negatively influence the level of perceived risk. Perceived Information Quality negatively influenced the level of perceived risk.

Summary of Findings of the Impact of PIQ on Trusting Belief

Research Question 3 was how does perceived information quality impact trusting belief? The third hypothesis (H3) stated in CSCW environments; perceived information quality will negatively influence the level of trusting belief. The causal relation was tested as detailed in Chapter 4 between the Perceived Information Quality and Trusting Belief. The results showed that Perceived Information Quality was a statistically significant and positive predictor of Trusting Belief. The researcher's hypothesis that in

CSCW environments, perceived information quality will negatively influence the level of perceived risk was accepted (β = .74, p < .001, supported).

Summary of Findings of the Influence of Perceived Risk, Trusting Belief on Intention to Use

Research Question 4 was how does perceived risk impact intention to use technology CSCW (SharePoint)? The fourth hypothesis (H4) stated that in CSCW environments, perceived risk would negatively influence the intention to use a CSCW. The causal relation was tested as detailed in Chapter 4 between the Perceived Information Quality and Perceived Risk. Perceived Risk was a positive and statistically significant predictor of Intention to Use.

The researcher's hypothesis that in CSCW environments, perceived risk will negatively influence the intention to use a CSCW was not accepted (β = .71, p < .001, not supported). Research Question 5 was how does trusting belief impact intention to use technology CSCW (SharePoint)? The fifth hypothesis (H5) stated that in CSCW environments, trusting belief will positively influence the intention to use a CSCW. The hypothesis was tested with ordinary least squares regression. Trusting Belief was a positive statistically significant predictor of Intention to Use was accepted (β = .61, p < .001, supported)

Additional Regression Analysis on Functional Diversity

An additional analysis observing functional diversity in regard to the research model to investigate its influence on perceived risk, trusting belief and intention to use was introduced further to investigate its possible influence on the other main constructs. The researcher initially looked at Functional Diversity's impact of PIQ. However, given

the fact that statistical significance was not be supported, the researcher further posited that by adding it to the model and performing additional regression analyses on the remaining constructs significant findings might be supported.

A regression analysis was conducted to examine whether Gender, Pay Grade (2 groups) and Perceived Information Quality predicted Perceived Risk (criterion variable). Based on the results of the multivariate regression, 29.6% (R^2 = .296) of the variability in Perceived Risk is accounted for by Perceived information Quality, Gender, Pay Grade (2 groups) and Functional Diversity (2 groups).

The model as a whole was statistically significant, $F(4, 208) = 21.89$, $p = .001$. As can be seen in Table 19, Perceived Information Quality was a negative and statistically significant predictor of Perceived risk ($B = -0.48$, $p = .001$). Gender was negative and a statistically significant predictor of Perceived Risk when the effects of Pay Grade, Functional Diversity, and Perceived Information Quality were held constant ($B = -0.32$, $p = .03$). Pay Grade was not a statistically significant predictor of Perceived Risk when evaluating the effects of Gender. Functional Diversity and Perceived Information Quality were held constant ($B = -0.21$, $p = .27$).

Functional Diversity was not a statistically significant predictor of Trusting Belief to influence the intention to use a CSCW. However, Perceived Risk was a negative predictor in the regression model, and Trusting Belief was a positive predictor in the regression model.

Table 23: Regression: between Perceived Information Quality, Functional Diversity and Perceived Risk (H2)

Model	*B*	Std. Error	*β*	*t*	*p*
Perceived Information Quality	-0.48	.05	-.52	9.00	.001
Gender	-0.32	.14	-.14	2.18	.03
Pay Grade (2 Groups)	-0.21	.18	-.07	1.11	.27
Functional Diversity (2 Groups)	.02	.13	.01	.17	.87

A regression analysis was conducted to examine whether gender, Pay Grade (2 groups), Functional Diversity (2 groups) and Perceived Information Quality predicted Trusting Belief (criterion variable). Based on the results of the multivariate regression, 55% (R^2 = .550) of the variability in Trusting Belief is accounted for by Perceived information Quality, Gender, and Pay Grade (2 groups). The model as a whole was statistically significant, $F(4, 208) = 63.65$, $p = .001$. As can be seen in Table 20, Perceived Information Quality was a positive and statistically significant predictor of Trusting Belief ($B = 0.71$, $p = .001$).

Pay Grade was a positive statistically significant predictor of Trusting Belief when the effects of Gender, Functional Diversity and Perceived Information Quality were held constant ($B = 0.42$, $p = .007$). Gender was not a statistically significant predictor of Trusting Belief when the effects of Pay Grade, Functional Diversity, and Perceived Information Quality were held constant ($B = 0.19$, $p = .12$). Given these findings, Functional Diversity was not found to be a predictor of Perceived Information Quality's influence on the level of trusting belief.

Table 24: Regression between Perceived Information Quality Functional Diversity and Trusting Belief (H3)

Model	*B*	Std. Error	*β*	*t*	*p*
Perceived information Quality	0.71	.05	.73	15.71	.001
Gender	0.19	.12	.08	1.56	.12
Pay Grade (2 Groups)	0.42	.15	.14	2.72	.007
Functional Diversity (2 Groups)	0.07	.11	.03	.65	.52

A regression analysis was conducted to examine whether FD (2 groups), gender, Pay Grade (2 groups), TB and PR predicted INT a CSCW. Based on the results of the multivariate regression, 55.5% (R^2 = .555) of the variability in Intention to Use is accounted for by Perceived information Quality, Trust Belief, Gender, and Pay Grade (2 groups). The model as a whole was statistically significant, $F(4, 208) = 64.72$, $p = .001$. As can be seen in Table 19, Perceived Risk was a negative and statistically significant predictor of Intention to Use ($B = 0.63.$, $p = .001$). Trusting Belief was a positive statistically significant predictor of Intention to Use when the effects of Gender, Perceived Information Quality, and Pay Grade were held constant ($B = 0.35$, $p = .001$). Gender ($B = -0.17$, $p = .067$) and Pay Grade ($B = -0.11$, $p = .55$) were not a statistically significant predictors of Intention to Use.

Table 25: Regression between Perceived Information Quality, Trusting Belief and Intention to Use (H4/5)

Model	*B*	Std. Error	*β*	*t*	*p*
Perceived Risk	-.635	.063	-.542	-10.079	.001
Trust Belief	.352	.060	.313	5.847	.001
Gender	-.162	.136	-.062	-1.179	.194
Pay Grade (2 groups)	-.277	.173	-.082	-1.593	.08
Functional Diversity (2 groups)	.10	.121	.04	.819	.414

Contribution

This study contributes to information systems (IS) theory in two ways. First, the researcher finds PIQ to be an important IS construct in CSCW environments. PIQ was found to have a significant effect on the intention to use a CSCW through perceived risk and trusting belief. While other studies relate PIQ directly to intention to use (DeLone & McLean 2003), this study contributes to the literature by finding that risk and trust influence this relationship in the CSCW domain. In their research, Nicolaou and McKnight (2006) discussed a similar effect of perceived information quality on trust and risk during initial exchange interaction among transacting business between partners, suppliers retailers. Second, this study builds on the IS theory by studying the effects of functional diversity as an antecedent of PIQ. Although the result did not show a direct impact on PIQ, this finding adds to the body of knowledge of antecedents of PIQ

The findings of this study are particularly important for federal government collaborative system designers and managers and the system users engaged in the usage

of CSCW because they have several potential implications for practice. Attention should be focused on building positive relationships among contributors in order to enhance the perception of information quality and the mitigation of perceived risk of contributing to the CSCW.

Both of these variables may interact with or impact trusting belief, which has a positive and significant impact on the intention to use and/or continues to use the CSCW. Providing a trusting CSCW climate would promote contribution to the CSCW of ideas, opinions, collaboration, and other input that promotes both team and organizational development.

In fact, literature on diversity in the workplace found that perceived risk is likely to decrease the intention to use the CSCW. (Lee & Song, 2013). Moreover, according to Nicolaou and McKnight (2006), as an individual higher level of trusting belief, he/she will be the most motivated to use the CSCW. Furthermore, team members with similar backgrounds tend to trust without condition (Pearson & Balacheff, 2003; Plotnick et al., 2011). Consequently, CSCW practices that aim to mitigate perceived risk of contributors enhance the overall intention to use a CSCW. Therefore, as indicated in earlier research Maltz (2000), the organization must focus efforts on specific initiatives to improve or increase discipline members usage of the CSCW.

This study of CSCW was conducted in a public sector institution. Hence, investigation of CSCW in this space is a departure from the norm of CSCW studies, because the majority of research is more often conducted in the private sector settings. This study is significant because it adds to the field of knowledge in the public sector. Public sector firms are often neglected and understudied in CSCW.

Limitations of the Study

A number of procedures were taken to diminish limitations. However, two limitations remain and are discussed in this section. First, a limitation noted is the fact that the main study utilized a single organizational setting and a single CSCW for this study. Therefore, these findings may not be readily generalizable or relevant for other government agencies or private sector organization. Hence, the replication of the study at different agencies would enable better generalizability of this study. Additionally, these results may not address the impact of having multiple CSCW platforms. However, these finding might still be widely applicable, as they will help with general CSCW development considerations.

The second limitation was the use of the discipline SharePoint in the study might have influenced the outcome for trusting belief in CSCW as well as the effects of trusting belief antecedents due to the high degree of system familiarity (Bart, et al., 2005). Consequently, the researcher took a number of steps during data collection to enhance the diversity of respondents to ensure a representative sample of respondents had varying levels of system familiarity with the CSCW.

An additional limitation was the low survey response rate. Data collection for the survey occurred over a three-week period. Data collection began at the end of October and closed just prior to the Thanksgiving holiday. The number of respondents may well have increased had the data collections been extended. However, given that the power analysis indicated that a total sample size of 146 was satisfactory to detect a significant model for this study and that by surpassing that by more than 100 respondents by

reaching 248 responses were suitable for the purpose of this investigation, the researcher concluded that the response rate did not create a non-response bias.

Recommendations for Future Research

While this study contributed to the literature surrounding functional diversity and its relationship with perceived information quality and intention to use or continue to use a CSCW in an organization, there are several areas for future research. Future research could include different agencies and multiple CSCW to enhance the generalizability of the results. This model could be tested across the different functional backgrounds in several industries and in organization settings with high, as well as low, team diversity to test generalizability.

Recommendations for future research include performing additional research within other federal government organizations of government as well as in private sector organizations. Such research would make available further empirical data for comparison as well as additional insight into employee functional diversity and CSCW.

Possible additional areas of future study could center on the investigation of a functional diversity difference among hard engineering versus soft engineering. The investigation this one facet would sharpen the study's focus and allow an in-depth exploration that would perhaps lead to greater understanding of the feature investigated and its relationship to CSCW adoption. Future studies could focus on fewer or more condensed categories of functional diversity. For instance, the type of discipline (category or variety)—i.e., hard engineering (structures, construction management, hydraulic) versus soft engineering (air quality, planning, environment), would motivate teams members to continue to use a CSCW.

Also, future research could investigate technology support for CSCW. Potential questions for examination comprise what actions technology support can take to encourage CSCW adoption, and what discipline affiliations demonstrate on functionally diverse teams.

Conclusion

The purpose of this study was to examine the influence of functional diversity on perceived information quality. Specifically, how the users' perceived information quality of the shared information is impacted by the functional diversity of the participants within the collaborative work environment. Additionally, the purpose of this study was to address the research questions of how the functional diversity of contributors, within the disciplines influence perceived information quality, which in turn influences the trusting belief, perceived risk and intention to use a computer supported collaborative work environment (CSCW).

The study produced a number of key findings. First, the study found that functional diversity of contributors not to be a statistically significant predictor of PIQ within CSCW. In fact, there was no statistically significant difference in perceived information quality by functional diversity groups, by gender, by office reported to, or by pay grade for Hypothesis 1. In particular, discipline members in this study were not significantly impacted by being on a homogenous or heterogeneous team concerning the assessment of perceived information quality within the CSCW.

There are a number of interesting and significant research directions, which this study can be used as a starting point. They include extensions to the research conducted, such as different subjects, disciplines, and/or CSCW types. Additional, the finding of the

statistically significant impact of Functional Diversity on perceived risk may provide other avenues for further research.

This study's findings draw attention to the value of devoting more attention on the attitudes and behaviors of the functionally diverse individual and teams engaged in collaborative efforts utilizing CSCW. This study expands on existing literature by investigating the occurrences of CSCW collaboration through a functionally diverse lens.

This research has identified a number of key organizational factors that need to be considered to have an influence on functionally diverse teams utilizing CSCW. Perceived Information Quality is important variables in CSCW. In this study, as found in Nicolaou and McKnight (2006) demonstrated a direct effect through Trusting Belief and Perceived Risk on intention to use the CSCW. However, functional diversity was not found to either positively or negatively associated with perceived information quality.

However, the finding that Functional Diversity is statistically significant within the model with regards to perceived risk and gender. The study results provide further knowledge into the dynamics of CSCW in an area not often studied in the current literature and represent a step towards greater understanding of the determinants that affect employee PIQ, perceived risk, trusting belief, intention to use as it relates to CSCW behavior.

Appendix A

Sources of Survey Items

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly,* 319-340.

Nicolaou, A. I., & McKnight, D. H. (2006). Perceived information quality in data exchanges: Effects on risk, trust, and intention to use. *Information Systems Research, 17*(4), 332.

Appendix B

Study Invitation E-Mail

From: Lucero, Amy (FHWA)
Sent: Wednesday, October 28, 2015 6:44 PM
To: Spriggs, Eric (FHWA)
Subject: Request your assistance: Survey on Discipline Support System Collaboration Practices

Dear Discipline Member,

I am writing to tell you about a study being conducted by Eric Spriggs. As the Discipline Support System (DSS) Sponsor, I am involved in all aspects of improving disciplines including collaboration efforts. In order to understand and find better ways to enhance collaboration practices of the disciplines, Eric is studying how discipline members' perception of collaboration practices within the DSS influences the use of SharePoint.

This study attempts to determine how an individual's functional work background and training (discipline affiliation) impact the intention to use a discipline SharePoint site for collaboration efforts. An underlying assumption of the study is that the level of impact correlates to team composition. Hence, if an individual is on a team comprised of the same discipline versus a team comprised of a diverse group of disciplines, the intention to use will increase or decrease respectively.

I am not a member of Eric's research team. However, I am contacting members of the discipline to let them know about the research in case they might be interested in learning more and in assisting us with getting information that will help us make the DSS more effective. Your participation is voluntary. Whether or not you participate in this study will have no effect on your relationship with FHWA or discipline activities. If you are interested in assisting with this study, please visit https://www.surveymonkey.com/r/DSS_COLLAB, where you can also find additional information about the study. If you choose to join the study, complete the survey and submit it following the online instructions. This survey is anonymous. No one, including the researcher, will be able to associate your responses with your identity. If you have any questions or would like more information, you can also contact Eric Spriggs via email at eric.spriggs@dot,gov<mailto:eric.spriggs@dot,gov> or by phone at 202.366.9195.

If you are not interested in responding to the survey, you do not need to anything else, and you can simply disregard any subsequent communication on the study.

Thank you for your consideration.

Amy

Appendix C

Survey Instrument

Thank you for your interest in my study. As a discipline member, your participation is critical for furthering the understanding of the possible impact of discipline affiliation to contributing to SharePoint-based collaboration systems. By answering this questionnaire, you help to ensure the inclusion of various perspectives of discipline members.

The purpose of this research study is to expand understanding of the intention to use or the continuation of the intention to use a SharePoint computer supported collaborative work system. The study is in partial fulfillment of doctoral program requirements at Nova Southeastern University's College of Engineering and Computing at Fort Lauderdale, Florida. I plan to analyze a sample of FHWA primary discipline members who have used a SharePoint site for collaboration in the past 48 months.

This study attempts to determine how an individual's functional work background and training (discipline affiliation) impacts the intention to use a discipline SharePoint site for collaboration efforts. An underlying assumption of the study is that the level of impact correlates to team composition. Hence, if an individual is on a team comprised of the same discipline versus a team comprised of a diverse group of disciplines, the intention to use will increase or decrease respectively. As you respond to the questions, please consider an effort with a team, work group or task force you collaborated with utilizing SharePoint.

Completion of the survey is voluntary and estimated to take approximately 7 to 10 minutes. The survey is confidential. Responses to the survey are completely anonymous and no information will be traceable back to individual survey respondents.

* 1. Have you responded to this survey before?

- ◯ Yes
- ◯ No

* 2. What is your primary discipline?

* 3. What role(s) do you play in your primary discipline?

- [ ] 1 = Member
- [ ] 2 = SharePoint Site Owner
- [ ] 3 = Discipline Committee Member
- [ ] 4 = Discipline Champion
- [ ] 5 = Discipline Council Representative
- [ ] 6 = Discipline Sponsor (Generally this is an AA, DFS or HQ Office Director)

* 4. Are you a Resource Center employee?

- ◯ Yes
- ◯ No

* 5. A 100.0% Please enter you team's name – ENTER YOUR FULL TEAM NAME. Please no acronyms. If the team was informal and did not have a name, please enter a working title (e.g. MAP-21 Review Team).

* 6. To which RC team are you assigned?

* 7. Do/Did any of the members of [Q5][Q6] have a different primary discipline than you have?

- ◯ Yes
- ◯ No

* 8. How many primary discipline(s) are on the [Q5][Q6] (Include yourself in the number of members)?

	# Members
1 = Administrative and Support Services	
2 = Air Quality	
3 = Civil Rights	
4 = Communication & Marketing	
5 = Construction and Project Management	
6 = Design	
7 = Environment	
8 = Financial Management	
9 = Freight	
10 = Geotechnical	
11 = Human Resources	
12 = Hydraulics	
13 = Major Projects	
14 = Operations	
15 = Pavement & Materials	
16 = Program and Management Analyst	
17 = Program and Project Delivery	
18 = Planning	
19 = Safety	
20 = Structures	

* 9. Has [Q5] [Q6] utilized a SharePoint site for collaborative efforts (team/group discussions, team/group meetings, work groups, team/group training, editing or commenting on draft documents, etc.) anytime from January 2012 to the present?

- ◯ Yes
- ◯ No

* 10. Please answer the questions below dealing with your perception of the usage of SharePoint for collaboration efforts.

	1 = strongly disagree	2 = disagree	3 = somewhat disagree	4 = Neither agree no disagree	5 = Somewhat agree	6 = agree	7 = strongly agree
PIQ.1. The SharePoint site provides data that is current enough to meet my business needs. (currency)	◯	◯	◯	◯	◯	◯	◯
PIQ2. There are no accuracy problems in the data I use or needed in this SharePoint site. (accuracy)	◯	◯	◯	◯	◯	◯	◯
PIQ.3. The data maintained by the SharePoint site is pretty much what I need to carry out my tasks. (relevance)	◯	◯	◯	◯	◯	◯	◯
PIQ.4. The transaction data transmitted are actually processed by the SharePoint. (completeness)	◯	◯	◯	◯	◯	◯	◯
PIQ.5. The discipline SharePoint site maintains data at an appropriate level of detail for my purposes. (relevance)	◯	◯	◯	◯	◯	◯	◯
PIQ.6. The data I enter on the discipline SharePoint site can be relied upon. (reliability)	◯	◯	◯	◯	◯	◯	◯
PIQ.7. The data is up-to-date enough for my purposes. (currency)	◯	◯	◯	◯	◯	◯	◯
PIQ.8. The SharePoint site provides up-to-date information with regard to past collaborative efforts. (currency)	◯	◯	◯	◯	◯	◯	◯
PIQ.9. The same data I enter on the SharePoint site are the ones received by other members. (accuracy/completeness)	◯	◯	◯	◯	◯	◯	◯

* 11. How would you characterize the decision to use the discipline SharePoint site offered to collaborate with your peers in term of it being an opportunity or threat?

* 12. How would you characterize the decision to use of the discipline SharePoint site offered to collaborate with your peers in term of it providing you the potential for gain or loss?

* 13. How would you characterize the decision to use of the discipline SharePoint site offered to collaborate with your peers in term of it providing you the potential for it being a positive or negative situation?

* 14. Please answer the questions below dealing with your perception of the usage of SharePoint for collaboration efforts.

	1 = strongly disagree	2 = disagree	3 = somewhat disagree	4 = Neither agree no disagree	5 = Somewhat agree	6 = agree	7 = strongly agree
TB.1. I believe that SharePoint contributor act in my best interest.	○	○	○	○	○	○	○
TB.2. If I required help, the SharePoint site contributors would do its best to help me.	○	○	○	○	○	○	○
TB.3. The SharePoint site contributor is interested in my well-being, not just its own.	○	○	○	○	○	○	○
TB.4. The content on the SharePoint site is truthful.	○	○	○	○	○	○	○
TB.5. I would characterize the SharePoint site contributor as honest.	○	○	○	○	○	○	○
TB.6. The SharePoint site contributors would keep its commitments.	○	○	○	○	○	○	○
TB.7. The SharePoint site contributors are sincere and genuine.	○	○	○	○	○	○	○
TB.8. The SharePoint site contributors are competent and effective in providing information.	○	○	○	○	○	○	○
TB.9. The SharePoint site contributors perform their role of providing information very well.	○	○	○	○	○	○	○
TB.10. Overall, the SharePoint site contributors are capable and proficient SharePoint site providers.	○	○	○	○	○	○	○
TB.11. In general, the SharePoint site contributors are very knowledgeable about discipline issues.	○	○	○	○	○	○	○

* 15. Please answer the questions below dealing with your Intention to use the SharePoint site again.

	1 = extremely unlikely	2 = unlikely	3 = somewhat unlikely	4 = Neither likely nor unlikely	5 = Somewhat likely	6 = likely	7 = extremely likely
INT.1. I would continue using the SharePoint site in the future to collaborate with other discipline members.	○	○	○	○	○	○	○
INT.2. If I were faced with using the discipline SharePoint site in the future, I would use it again.	○	○	○	○	○	○	○
INT.3. If a similar circumstance arises in the future, I would feel comfortable using discipline SharePoint site again to collaborate with other members.	○	○	○	○	○	○	○
INT.4. I would recommend using a discipline SharePoint site to other discipline members who may be faced with similar collaboration needs.	○	○	○	○	○	○	○

* 16. What is your grade range?

* 17. To which office do you report?

* 18. What is your gender?

* 19. In what state or U.S. territory do you live?

* 20. What is the highest level of education you have completed?

* 21. What is your race?

- ◯ 1 = American Indian or Alaska Native
- ◯ 2 = Asian (e.g., Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese)
- ◯ 3 = Black or African American
- ◯ 4 = Native Hawaiian or other Pacific Islander (e.g., Samoan, Guamanian, or Chamorro)
- ◯ 5 = White
- ◯ 6 = Decline to respond

Some other race (please specify)

* 22. Cultural Variables (Ethnicity Are you Spanish/Hispanic/Latino)

- ◯ 1 = No, not Spanish/Hispanic/Latino
- ◯ 2 = Yes, Mexican, Mexican-American, Puerto Rican, Cuban, or other Spanish/Hispanic/Latino
- ◯ 3 = Decline to respond

Some other race (please specify)

* 23. What is your secondary discipline?

* 24. What role(s) do you play in your secondary discipline?

- ◯ 1 = Member
- ◯ 2 = SharePoint Site Owner
- ◯ 3 = Discipline Committee Member
- ◯ 4 = Discipline Champion
- ◯ 5 = Discipline Council Representative
- ◯ 6 = Discipline Sponsor (Generally this is an AA, DFS or HQ Office Director)

Thank you for previously participating in this research. We only require one response from you.

Thank you for taking the time to participate in this survey!

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