IMPACT OF SUPER USER SUPPORT ON USER PERCEPTIONS AND SATISFACTION WITH INTEGRATIVE TECHNOLOGIES: A SOCIAL PRESENCE PERSPECTIVE

IMPACT OF SUPER USER SUPPORT ON USER PERCEPTIONS AND SATISFACTION WITH INTEGRATIVE TECHNOLOGIES: A SOCIAL PRESENCE PERSPECTIVE

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Abstract

Enterprise Information Systems (EIS) are large systems that enable the integration of business processes and allow seamless business process data flow throughout the organization. An EIS implementation is considered a failure if it is being cancelled; if it is removed early with relevant financial and organizational losses; or if the implementation resulted in a system being underutilized due to dissatisfaction, overspend or poor requirements gathering. Despite excessive spending over the years on digital transformation projects of such systems, failure rates have been excessively high.

This research explores Super User effectiveness as an integral part of digital transformation processes. Super Users are regular but highly motivated employees who receive additional training in the use of a new or upgraded computer system to be introduced in the workplace, so that they can provide first-line technical support and training to their local colleagues. Super Users are frequently engaged in guiding and supporting users throughout and after EIS implementations or system upgrades. User satisfaction with the training process and Super User support effectiveness tends to contribute to more successful system transition and EIS implementation success. However, the role of Super Users in EIS implementations as a first line of education and support for EIS users has been substantially understudied as a potential way of reducing these failure rates.

Although several studies have explored desired Super User characteristics in EIS systems implementation and successful organizational digital transformation processes, there has been a lack of attention to user perceptions of integrative systems as a contributing factor

to better system utilization and implementation. This research explores Super User effectiveness as an integral part of digital transformation processes.

A Theoretical Model was developed that draws from accepted theories of collaborative technology, technology adoption, and expectation confirmation. A survey was used to gather responses of 321 end users about their perceptions of Super User support and effectiveness, derived from their experience in several organizations that had undergone digital transformation.

The study data were analyzed quantitatively, and the model validated through a structured equation model that was developed, based on relevant published models. A further explanatory study was conducted through thematic analysis of written participant responses.

Our study found that Super User ability to emphasize the collaborative features of integrative systems by augmenting user perceptions of EIS as a social presence medium can contribute to higher levels of user performance and satisfaction. Immediacy of integrative systems as well as Individual user characteristics were found to play a positive role in user performance and satisfaction improvement. Situational characteristics of resource-facilitating conditions was also found to contribute positively to user performance and satisfaction.

This study contributes to existing research on integrative systems characteristics and Super User effectiveness. It emphasizes collaborative components of integrative systems and discusses additional tools and expanded capabilities for systems utilization and user

learning. It also expands on our understanding of Super User effectiveness through an exploration of user perceptions of integrative systems as a social presence medium and effective collaboration tool. Practitioners can thereby emphasize to users the resulting augmented capabilities that can contribute to effectiveness of the Super User training and development process. Practitioners should therefore urge organizations to focus on Super User selection and development as effective organizational resources that facilitate user support through organizational changes associated with EIS implementations, thereby contributing to increases in EIS implementation success rates.

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1. Introduction

Worldwide annual spending by organizations on digital transformation projects is in the neighborhood of $1.3 trillion U.S. per year (Ramesh & Delen, 2021). Despite the enormous amount of spending on digital transformation, in Enterprise Information Systems (EIS) implementation and adoption, failure rates are extremely high. EIS were defined earlier as systems that integrate business processes and allow seamless business process data flows. An EIS implementation is considered a failure if: an implementation project is being cancelled; if it is removed early with relevant financial and organizational losses; or if the implementation resulted in a system being underutilized due to dissatisfaction, overspend or poor requirements gathering. EIS failure rates have been reported in the literature at 70%, 87.5%, 90% and even 97% (Ramesh & Delen, 2018, 2021; Wade & Shan, 2020; Li, 2020; Saldanha, 2019; Rodríguez-Abitia & Bribiesca-Correa, 2021). Well-known examples of EIS implementation failures that resulted in systems cancellation, underutilization or removal with millions of dollars in financial losses were at *Revlon* in 2019, *Nike* in 2001, *Avon* in 2013, *Lidl* in 2015, *Hershey* in 1999, *National Grid* in 2012 and *Hewlett Packard* in 2004 (Saud, 2022).

Super Users are an integral part of organizational digital transformation processes. In regards to the organizational integrative systems, Super Users are involved in guiding and supporting the users throughout and after EIS implementations or upgrades. Super Users are defined as regular employees who receive additional training in the use of a new or upgraded computer system to be introduced in the workplace, so that they can provide first-line technical support and training to their colleagues locally (Åsand and Mørch, 2006;

Boffa and Pawola, 2006; (J. Vaag et al., 2022)). Super User technical and people knowledge, organizational and functional area understanding and interpersonal and professional skills, form a foundation for successful knowledge transfer and user satisfaction (Bygholm, 2018; Obwegeser et al., 2019; Vaag et al., 2022).

This study focuses specifically on Super User involvement in EIS implementations as a part of organizational digital transformation undertakings, because EIS are the most comprehensive and expensive systems that organizations can invest in to create a competitive advantage. EIS are defined as systems that integrate business processes and allow seamless business process data flow. EIS are powerful tools that allow business users to input their respective business functional area information and integrate it within all other business processes of the firm. EIS create a holistic view of business operations and allow management to readily analyze business performance. Success in implementation and use of EIS are defined as organizational success in terms of digital transformation efforts, increased organizational efficiency and effectiveness, and reinforced organizational positions in the market among their competitors.

Decisions on an EIS choice and its implementation process is a strategic organizational decision. This decision is made by executive management and does not typically involve actual future EIS users. However, success of the EIS implementation process and its subsequent effective use is defined to a high degree by the system's users, including middle management, employees and other organizational stakeholders that are ultimately the major users of EIS data input and management.

New or upgraded EIS knowledge transfer processes during implementation and subsequent EIS use by users is guided primarily by Super Users. Inadequate user training and support from Super Users, resulting in unrealized user expectations and low user satisfaction (Verhoef, 2021) are crucial factors contributing to increased digital transformation failure rates (Arasanmi, 2019). If users don't understand how to use the new or upgraded system, or if they don't receive adequate support, they may not use the system effectively, reducing the potential benefits of the EIS (Kenge & Khan, 2020; Shafi et al., 2019).

Based on the above, the role of Super User effectiveness in user satisfaction with a new or upgraded EIS is a critical factor that must be brought into focus for better understanding and further research that will improve returns on EIS investment.

1.1 Research Motivation

High failure rates in EIS implementations and organizational digital transformations worldwide not only create huge amounts of wasteful spending but hinder organizational progress in innovation and performance, thereby creating inefficiencies and unrealized benefits (Øvrelid, 2019; Ferreira, 2019). Various factors contribute to high EIS implementation failure rates. However, the role of Super Users in EIS implementations as a first line of education and support for EIS users has been substantially understudied as a potential way of reducing these failure rates. Research in Super User characteristics and effectiveness for the past two decades is represented by a limited number of qualitative case studies and a handful of attempts at quantitative analysis research (Karuppan & Karuppan, 2008; Larsen, 2009). Basically, there have been minimal efforts from the research community to develop an understanding of the role of Super Users as an integral part of

user understanding, experience and perception of new or upgraded EIS as a tool for organizational competitive advantage and successful digital transformation. And finally, no studies have been found that explore the Super User role as an effective means to inform user perceptions of a new or upgraded EIS as a rich and efficient collaborative medium to create a sense of positive environment, personal touch and strong social presence. This could in turn facilitate faster user learning, and increase user satisfaction with newly adopted EIS.

1.2 Research Objectives

The objectives of this research are to emphasize the role of the Super User as an integral part in increasing user satisfaction in the EIS implementation process, by exploring the Super User role as an effective way to guide user perceptions of the EIS. Adopting appropriate EIS perceptions as an effective collaborative medium could help users to develop a sense of social presence while using this technology. The social presence terminology was first introduced and explored in relation to research on collaborative technology selection and adoption (Short, 1976). Social presence was defined as a quality of collaborative media that increase user performance. Therefore, this study focuses on Super User effectiveness in helping to frame user perceptions of a new or upgraded EIS as a rich and efficient collaborative and coordinating medium with a sense to its users of a positive environment, personal touch and strong social presence.

This study also emphasizes the importance of prior user experience with similar technologies and knowledge areas, as well as familiarity with and working with other users

as a factor contributing to user perceptions of new or upgraded EIS formation, performance expectancy and facilitating condition expectations.

1.3 Research Questions

The research questions of this study emphasize the purpose and interest of the present research. The research questions attempt to understand the factors that could decrease user dissatisfaction or further increase user satisfaction with the EIS implementation and upgrade processes. The research questions challenge and further elaborate on existing literature on Super User facilitation effectiveness and explore technology characteristics and capabilities to discover additional valuable features of integrative EIS.

- ***RQ1****: What capabilities of integrative systems can help users to achieve higher satisfaction with EIS implementation and upgrade?*

- ***RQ2****: How does Super User facilitation impact user perception of integrative technologies?*

- ***RQ3****: How does the confirmation of user expectations of Super User facilitation effectiveness impact user satisfaction with a new or upgraded EIS?*

1.4 Thesis Outline

This study outlines the multifunctional and diverse requirements of the Super User role that are cited in the literature. These requirements must be met in order to increase user satisfaction and contribute positively to organizational digital transformation efforts. To succeed, organizations must rethink and revisit their Super User selection criteria, prioritize these criteria and establish standardized processes for Super User responsibilities, treat

Super Users as an integral part of the EIS implementation process, and uncover and cultivate Super User characteristics that support organizational digital transformation efforts (Obwegeser et al., 2019).

The following outlines the research flow in the thesis:

Chapter 1 – An introduction that explains the reasons, background and motivation for this research. It provides basic definitions and foundational knowledge of the research components.

Chapter 2 - A Literature Review presents relevant research on concepts of Super Users, Digital Transformation, EIS and User Satisfaction.

Chapter 3 – Creates a Theoretical Foundation, including an overview of theories and models utilized in this research as well as the existing research gap and research questions.

Chapter 4 – Reveals the adopted Research Model and presents definitions of Constructs and Hypotheses.

Chapter 5 – Describes the study methodology, design, sampling and recruitment, data collection and analysis and construct measurements.

Chapter 6 – Presents the Research Results and Data Analysis.

Chapter 7 – Presents the Discussion, Contribution, Limitations, Future Research and Conclusions.

1.5 Chapter Summary

In Chapter 1 – Introduces the research motivation, research objectives, research questions and thesis outline. The existing problems in EIS implementation processes that cause multimillion dollars in organizational losses and increased user dissatisfaction. These issues motivated this research, to bring to light the potential root causes of this problem, to find a solution that might decrease high EIS implementation failure rates. Our research objectives outline how this study intends to propose a possible solution, by posing research questions that this research intends to address. The Thesis Outline presents the topics of all the study chapters for easier navigation and reading.

2. Literature Review

Previous studies in EIS implementations have shown the importance of user satisfaction in system implementation success, adoption and use. The factors affecting user satisfaction were top management support, training, system quality (Costa et al., 2016; Pérez Estébanez, 2021), supportive leadership, ease of use (Almajali et al., 2016), perceived usefulness (Zviran, 2005), process fit (Ng, 2013), user knowledge of system utilization (Watjatrakul & Vatanapitukpong, 2021), compatibility, task relevance, user characteristics (Holsapple, 2005), and system quality (W.-H. Tsai et al., 2012)

Much less attention in research on Enterprise Systems Implementation has been given to the crucial role of the Super User, who plays the role of knowledge transfer facilitator, training support and liaison between the IT implementation teams and management and organizational system users (Obwegeser et al., 2019; Pan & Mao, 2013; Vaag et al., 2022).

To review the up-to-date literature on the research topic, we start with EIS and follow up with up-to-date research on User Satisfaction and Super User support in relation to EIS implementation.

2.1 Enterprise Information Systems (EIS)

This study is focused on EIS implementations or upgrades. EIS are integrative technology systems that provide business-critical information to help enterprise-level functions make decisions and carry out essential tasks. EIS are defined as “software systems for business management, encompassing modules supporting organizational functional areas such as planning, manufacturing, sales, marketing, distribution, accounting, financial, human

resources management, project management, inventory management, service and maintenance, transportation and e-business" (Rashid et al., 2002). The concept of "system of systems" presents EIS as a mechanism that supports the value of collaborative relationships within a "collection of interdependent systems" (DiMario et al., 2009).

These systems help large organizations to streamline and automate a vast range of business processes, enabling them to operate more efficiently and make informed decisions more quickly. They are designed to support and automate business processes throughout the organization. EIS functions are concerned with "facilitating information, control and material flows across organizational boundaries by connecting all the necessary functions and heterogeneous functional entities (e.g. information systems, devices, applications and people) in order to improve the 3C's (communication, cooperation and collaboration) within the enterprise" (Vernadat, 1996).

There are currently many types of EIS integrative platforms that organizations may implement. Commonly used types of EIS with functional descriptions and definitions are listed in Table 1.

Table 1*. Types *of Enterprise Information Systems

EIS	Description	Definition
BI	Business Intelligence Systems	Tools and systems that play a key role in strategic planning within corporations. They help companies gather, analyze, and access the data that they need to make better business decisions. Examples of BI tools include *Tableau, Power BI*, and *Looker.*
CPM	Corporate Performance Management Systems	Covers the whole range of tasks in the area of strategic and financial administration of the company. This process monitors and manages an organization's performance, according to key

		performance indicators. Examples of CPMS systems are *Oracle Hyperion, IBM Planning Analytics*, *SAP Business Planning* and *Consolidation (BPC), Anaplan, BOARD, Host Analytics.*
CRM	Customer Relationship Management Systems	Focus on managing all aspects of an organization's relationships with its customers, including marketing, sales, and service. Examples of CRM systems include *Salesforce, HubSpot,* and *Zoho CRM*.
DBMS	Database Management Systems	Software for creating and managing databases. They provide users with a systematic way to create, retrieve, update and manage data. Examples include *MySQL*, *Oracle Database*, and *Microsoft SQL*.
EAM	Enterprise Asset Management Systems	Designed primarily for the automation of processes related to the maintenance of equipment, its repair and after-sales service. It provides optimal life cycle management of the physical assets of an organization. Examples are *IBM Maximo, SAP EAM, Infor EAM, IFS EAM, Aveva EAM, AssetWorks EAM.*
ECM	Enterprise Content Management Systems	Used to manage and coordinate digital content. While often associated with web content, they can also be used for document management, intranet content management, and more. Examples include *WordPress, Drupal,* and *Joomla*.
EDM	Electronic Documents Management Systems	A software complex based on computer programs used to track, manage and store documents. It usually has a client-server architecture. Examples of *EDM* are *Microsoft SharePoint, Google Workspace, Dropbox Business, Adobe Document Cloud, DocuWare, M-Files, Laserfiche.*
EHR	Electronic Health Records	Systematized collection of patient and population data stored in a digital format. These records can be shared across different health care settings. Records are shared through network-connected, enterprise-wide information systems or other information networks and exchanges. Some well-known examples of EHR systems include *Epic Systems, Cerner, Allscripts, Meditech, Athenahealth*, *Cerner Millennium* and *NextGen Healthcare*.

ERP	Enterprise Resource Planning Systems	Comprehensive systems designed to manage most or all aspects of an enterprise. This includes areas such as finance, human resources, supply chain, and manufacturing. Examples of ERP systems include *SAP, Oracle ERP Cloud,* and *Microsoft Dynamics 365.*
HRMS	Human Resources Management Systems	Manage various HR functions, including hiring and recruitment, payroll, training, employee records, performance analysis, and more. Examples of HRMS systems include *Workday, BambooHR*, and *ADP*.
SCM	Supply Chain Management Systems	Help manage the movement of goods, data, and finances related to a product or service from the procurement of raw materials to the delivery of the product at its final destination. Examples include *SAP SCM, Oracle SCM Cloud*, and *JDA SCM*.

As companies experience growth and expansion, their operations become more complex, involving multiple departments, stakeholders, and systems (Romero & Vernadat, 2016). However, collaboration and communication in these intricate business environments can present challenges, and organizations often face various obstacles that hinder their effectiveness. Traditional communication methods like emails, phone calls, and in-person meetings may not sufficiently address the needs of complex processes, leading to inefficiencies and information gaps.

In such scenarios, besides offering a comprehensive business process integrative solution, EIS play a vital role in enhancing collaboration within organizations. An EIS provides a centralized platform that streamlines communication and facilitates seamless cooperation among employees. By offering comprehensive integration of business processes, EIS

systems contribute to breaking down communication barriers and fostering effective collaboration within the organization.

EIS systems have a variety of built in and optional capabilities for instant messaging and video conferencing. Instant messaging and video conferencing allow employees to communicate and collaborate in real-time. Communication in real-time facilitates effective communication with ability to support problem solution, attend to urgent matters, seek clarifications and make decisions supported by cross-departmental data visibility, all within the same interface and without lengthy email chains and endless meetings. In addition to the advantages mentioned above, EIS often provide document sharing capabilities, shared calendars and project management boards. These capabilities can coordinate activities, share documents and assign tasks within one shared centralized platform and possibly eliminate other redundant communication and collaboration channels. However, employees may be accustomed to traditional communication methods and may resist adopting new collaboration features. To address this, it is crucial to communicate the benefits of EIS' collaboration capabilities and provide effective training and support to employees. The role of the Super User as a provider of training and support to users in EIS implementation or upgrade projects is crucial in these roles. The Super User becomes crucial in helping employees to discover and use the EIS communication and collaborative capabilities effectively. Support provided by Super User capability ensures a smooth transition of EIS implementations and upgrades, promoting increased organizational performance and efficiency (BPM, 2023; Chang & Seow, 2016; Ruivo et al., 2020).

This study focuses on research in user satisfaction, expectations of Super User roles and new dimensions of Super User support. For the purpose of this study, research on the organizational implementations of all EIS types mentioned in Table 1 were considered for review and analysis.

2.2 User Satisfaction

User satisfaction is a construct that refers to an overall evaluation and subjective assessment of user feelings and attitudes toward a product, service, or system. It describes how well user service experience meets or exceeds user expectations and needs. User satisfaction is a key measure of the success and quality of a product or service and plays a key role in shaping user behavior, attitudes and loyalty (DeLone, 1988). User satisfaction is an important aspect when designing and developing software, websites, applications, EIS implementations, and other technical interfaces (Urbach, 2010).

There are two types of definition for "user satisfaction", based on process and outcome. The process-oriented approach defines user satisfaction as the difference between expected satisfaction and achieved satisfaction. The outcome-oriented approach views satisfaction as an attribute derived from a product or service after its use (Vaezi et al., 2016). User Satisfaction in this case is defined as "the consumer's fulfillment response, a judgement that a product/service feature of the product or service itself is providing a pleasurable level of fulfillment" (Oliver, 2010).

Early research on User Satisfaction came from marketing and was subsequently adopted in the information systems literature. Research on User Satisfaction is significantly important

in understanding Information Systems (IS) implementation success. (DeLone & McLean, 1992) created a comprehensive taxonomy that consists of six major dimensions or categories, including system quality, information quality, use, user satisfaction, individual impact and organizational impact. Other antecedents of IS implementation success have been explored since then, such as system use, IS performance and IS effectiveness, factors influencing User Satisfaction (Kalankesh et al., 2020) and User Satisfaction measurement instruments (Bailey & Pearson, 1983) (Ives et al., 1983) (Baroudi & Orlikowski, 1988). Despite the high degree of prediction of IS implementation success that those antecedents were providing, user satisfaction still remains the most widely used predictor of IS implementation success (Vaezi et al., 2016). (J.-H. Wu & Wang, 2006) included Super User support as a factor influencing user satisfaction with knowledge management systems. My research will explore the effectiveness of super user support for user satisfaction and further system implementation success.

2.3 Super Users

Research on Super User characteristics has faced a number of issues that contain vague concepts and unclear boundaries. This tends to create greater ambiguity, adds confusion and hinders the proper development of knowledge.

First, a number of studies claim that a definition of "Super User" is similar to "Key User", "Expert User" or "Power User". "Super Users, also referred to as Key Users, Expert Users, or Power Users, can be defined as users with expert knowledge with regard to a particular system or processes" (Obwegeser et al., 2019, p.74; Mahdavian & Mostajeran, 2013, p.1981;(Danielsen, Sandfeld Hansen, et al., 2017). Ambiguity in concept definition such as

this opens the door for unclear objectives, uncertain conclusions and questionable research contributions.

Second, other research on Super Users references and builds on research on Key Users, and classifies them as inward and outward facing Super Users. Outward facing Super Users provide business processes knowledge to the EIS implementation team and inward facing Super Users facilitate training and support of End Users (Danielsen, Hansen, et al., 2017; Obwegeser et al., 2019).

Third, there are unclear research intentions and contributions of published research that cross-reference the distinct terms that are mentioned. Further development and classifications through cross references add more confusion about whether or not all further research development in one of those terms applies to all other terms and can be cross referenced further.

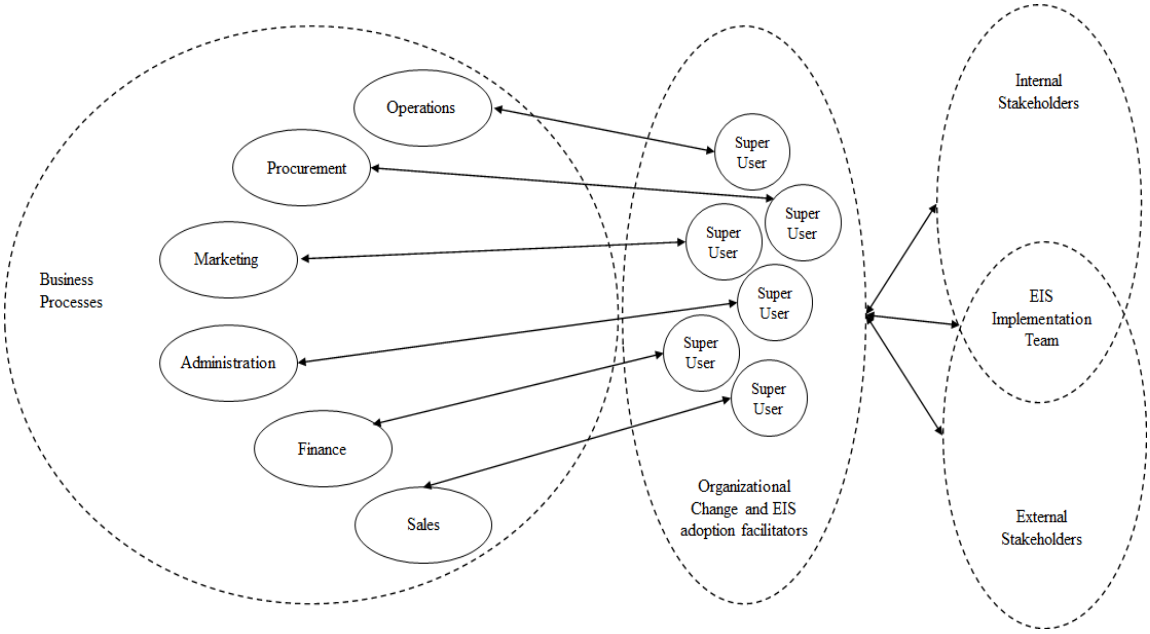
Ambiguity in understanding and differentiation of terms in the previous research resulted in various definitions of Super User. In some studies, Super User was defined as a support position which has evolved in most line departments which are "heavy users" of technology (Ronen & Baroudi, 1986). Other studies claim that Super Users are highly qualified professionals who can provide valuable insights for improving user interfaces, functionality and content. They closely interact with implementation team learning in every aspect of a new system functionality and serve as a link between the implementation team and the organizational system's users:

> "Specifically, a super-user is a user who has unrestricted access to the entire system whether it is the system commands or system files, regardless of their permission levels. These super-users require such access to manage risks across the enterprise by enforcing segregation-of-duty profiles and preventing security and control violations before they occur in core business processes. For example, super-users are able to address segregation-of-duty issues by detecting, removing, and preventing access authorizations risks within and across business processes. In this regard, super-users typically have access to the systems files and setup and 'have the highest level of privilege for applications" (Turner & Owhoso, 2009).

These studies describe Super Users as individuals within an organization who have advanced knowledge and expertise in specific technologies, systems, or processes; i.e. "a person who uses [the EHR] to its fullest capacity" (Shea et al., 2016, p.1196).

This study will focus on the role of Super User as a facilitator of knowledge transfer and management "A person from the department who has a profound understanding of internal processes and is responsible for knowledge management inside the department" (Pesoa, 2018, p.1). A Super User is the person who is responsible for thoroughly learning and understanding a new or different EIS solution. They learn from the implementation team and become an organizational change and EIS adoption facilitators, a link between the implementation team and the users (Figure 1). Super Users are also considered to be engaged, experienced, and influential users within the organization.

Figure 1. Super Users as Organizational Change and EIS Adoption Facilitators



A Super User is responsible for continuous improvement and managing knowledge within the department. A Super User possesses comprehensive understanding of the entire process, particularly the part executed by their department. Moreover, they are well-acquainted with their team, understand their needs, and are capable of guiding colleagues through changes. This role complements the role of the Process Owner and the Business Process Office (Pesoa, 2018). In contrast, a Key User, or a Power User, is an individual who possesses extensive technical knowledge of the system and is tasked with supervising a particular IT project. Once the project requirements are fulfilled, Key Users return to their original positions.

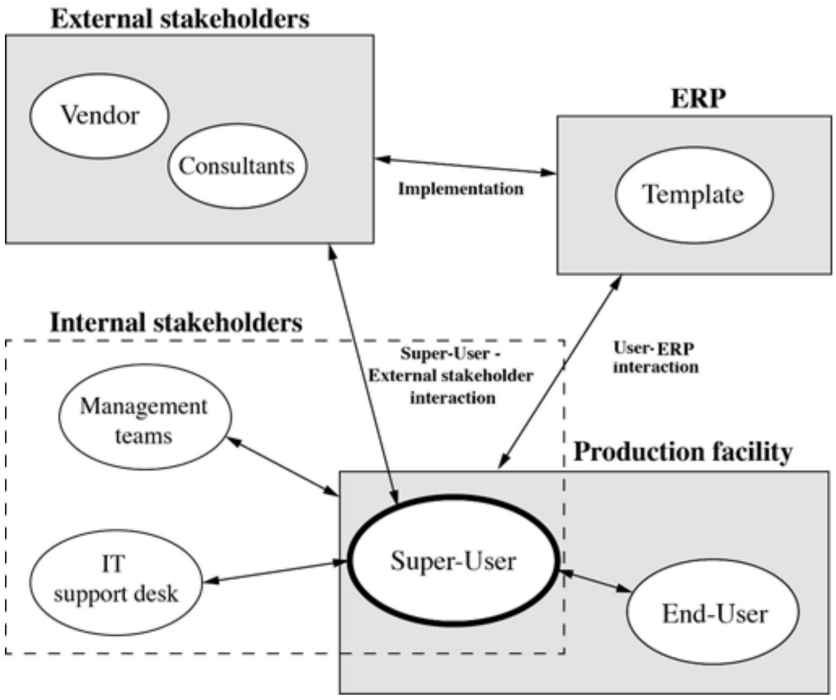
The goal of the Super User is to make processes work for the team. Unfortunately, many individuals perceive processes as mere flowcharts, procedures, or additional tasks that are required for specific projects. In reality, proper processes are the everyday activities that

create value for the business and every employee. A Super User must understand thoroughly the business processes in the organization as well as its business goals.

Besides being knowledgeable about business processes, a Super User should possess effective communication skills and be patient when teaching others. An optimistic attitude will significantly improve the team's attitude to their work as they adapt to changes and learn new technical skills associated with a new or upgraded EIS business system. Equally vital is the Super User's ability to convey employee concerns to the implementation team. Additionally, Super Users must be able to communicate user non-technical concerns about the system to management, while they are in transition from one system to another. They need to make sure the new system meets the expectations of management from the perspective of the organization's business processes, which must be fully adopted by the workforce (TEK, 2019). An overview of project stakeholders interacting with Super User during the EIS implementation process is presented in Figure 2.

(Markus & Tanis, 2000) examined the experiences and challenges experienced by users during system implementations. Super Users who possess a combination of technical expertise, adaptability, communication skills, problem-solving abilities, leadership, and user-centric mindset can contribute considerably to successful implementation processes. Super Users should possess specific characteristics that will contribute to user satisfaction. They collaborate with users and EIS implementation teams in knowledge acquisition, knowledge transfer and user support (Asand & Morch, 2006, 2008; Boffa & Pawola, 2006; J. R. Vaag et al., 2022; J. R. Vaag & Sætren, 2021).

Figure 2. Overview of Project Stakeholders Interacting with Super User during Implementation of an ERP(EIS) System



Note: Adapted from (Obwegeser et al., 2019)

However, despite some literature availability on Super User involvement and Super User impact in EIS implementations, the existing literature fails to look holistically at the critical part that Super Users play in Organizational Information Systems Integration. Super User contributions are often viewed from the perspective of generalized transfer of knowledge and technical skills to users. The significance of Super Users is often downplayed, and the role is not considered from a holistic view, such as organizational liaison between facilitator and contributor, as a multifunctional and diverse component that is an integral part of organizational EIS implementations.

A Super User is often treated as a temporary, part-time component of an organizational digital transformation process, as an internal resource that accepts an additional responsibility and has vaguely defined accountabilities, commitments and obligations. The Super User role often is not outlined in detail, and as a consequence the Super User is forced to do this work in conjunction with regular day-to-day internal job description responsibilities, in an unstructured environment where performance is not evaluated adequately (Halbesleben et al., 2009).

Although there had been attempts to apply Katz skill measurement model to measure Key User skills (Mahdavian & Mostajeran, 2013) the results show that the Key User skills level is inadequate. Vestas' Super User skills selection model also had several limitations; it was based on a single study and lack of involvement of the End User's perspective. Overall, the selection criteria and selection process of Super Users is not adequately discussed, is not transparent, often lacks a proper job description and does not account for individual and interpersonal skills and abilities. These omissions could play a crucial role by hindering rather than facilitating digital transformation success, including suppressing future Super User efforts and effectiveness, resulting in low user satisfaction and lessening operational EIS implementation success.

An extensive literature review of published Super User articles was conducted to identify all existing articles to date, following PRISMA guidelines. Two major databases – Web of Science and Scopus - were utilized for this purpose.

The search was conducted using the keywords "Super User", "Key User", "Power User" and "Expert User". The reasons for using those four terms was mentioned above, based on

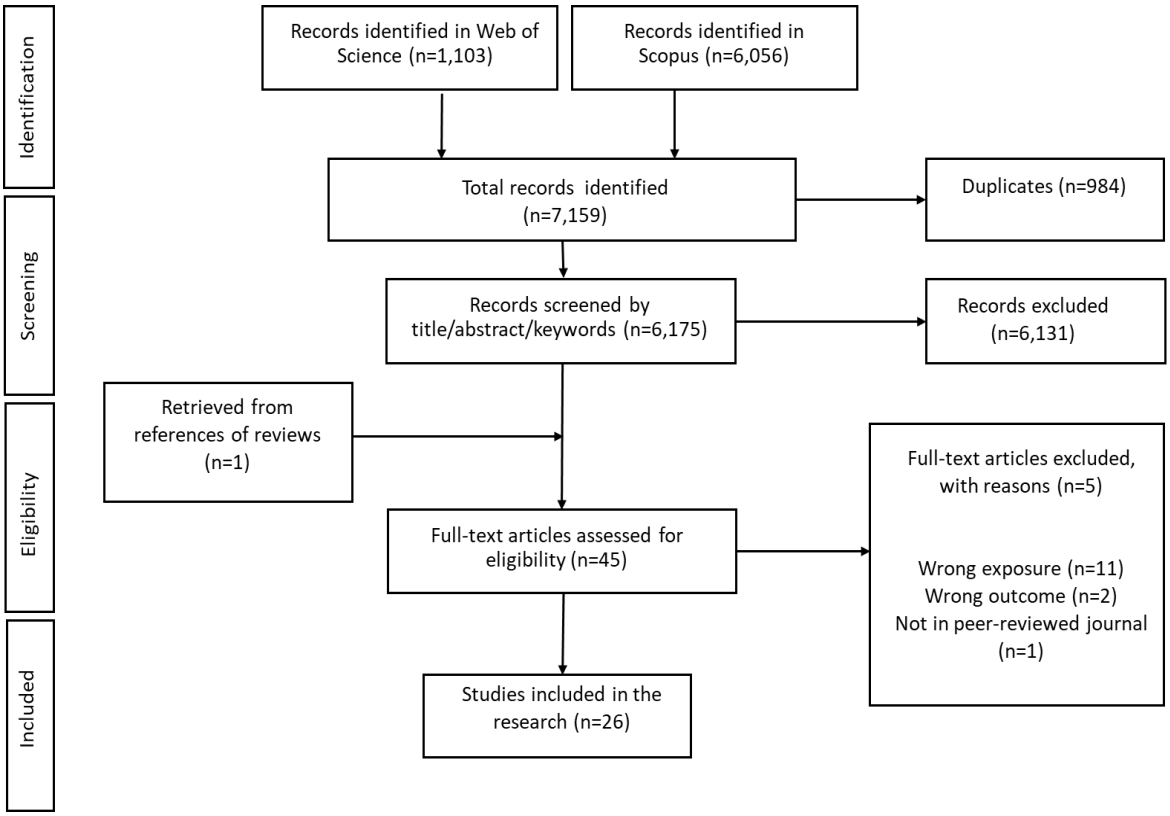
the fact that there is no clear definition or typology for the "Super User" term and various names are used for it in the literature (Mahdavian & Mostajeran, 2013; Obwegeser et al., 2019), depending on what domains they are used in and what terminology the authors are familiar with. Figure 3 displays the results of the literature search for articles following PRISMA guidelines (Moher et al., 2009).

The article search was conducted in two databases: Web of Sciences and Scopus. The search was performed on all published articles up to year 2022 inclusive. Four sequential searches by the key words Super User, Key User, Expert User and Power User, yielded a total of 1,103 articles in Web of Science and 6,056 articles in Scopus. The search could have been done using additional key words such us "implementation" or EIS implementation" to reduce the number of articles to more relevant context. However, the decision to perform a broad search was intentional with the objective to understand in what other contexts those terms had been used.

While there is an overlap between the roles of Super User, Key User, Expert User and Power User, Key Users, Expert Users and Power Users tend to have a more technical focus, supporting the adoption and use of specific technologies, whereas Super Users have a broader domain-specific and people-oriented focus, driving digital transformation efforts within their area of expertise (Pesoa, 2018). For simplicity of comprehension for relevant research findings, only the term "Super User" will be used throughout the remainder of the research study.

Based on the reviewed articles and research objectives, I will define Super Users as regular employees who receive additional training in the use of a new or upgraded EIS to be implemented in the workplace, so that they can provide first-line technical support and training for their colleagues locally (Åsand and Mørch, 2006; Boffa and Pawola, 2006; (J. Vaag et al., 2022)).

Figure 3 Literature review following PRISMA guidelines



Following PRISMA guidelines, 26 studies related to Super User characteristics such as Super User effectiveness and Super User selection criteria were identified. A summary of these studies is presented in Table 2.

Table 2. Super User Literature Review Summary

Enterprise Information System	**Country**	**Method**	**Super User Characteristics and Selection Criteria**	**Reference**
EDM Electronic Documents Management System	Norway	Qualitative Interviews	Availability and local knowledge, Technological skills, pedagogical skills, proactiveness. Learning culture category: Facilitate collective learning, engage with criticism, promote collective sharing. Individual learning category: Facilitate individual learning, provide instrumental support, provide emotional support	(J. R. Vaag et al., 2022; J. R. Vaag & Sætren, 2021)
EDM Electronic Documents Management System	UK	Qualitative Interviews	Depth of explanation, information sharing, comprehensive training	(Skok et al., 2013)
EDM Electronic Documents Management System	USA	Qualitative Case Studies	Teaching strategies, technical skills, change champions, positive frames communication, applicability ex learning by doing IT alignment, full commitment, extra support, act as liaison	(McNeive, 2009)
EHR		Qualitative	Super User workforce customization-	(Bullard, 2016)

Electronic Health Records System			specialized graduates, training, proactive support	
EHR Electronic Health Records System	USA	Mixed Methods	Proactivity, depth of explanation, positive framing, information sharing	(C. T. Yuan et al., 2015)
EHR Electronic Health Records System	USA	Qualitative Interviews	Depth of explanation	(Grabenbauer et al., 2011)
EHR Electronic Health Records System	USA	Qualitative Interviews	End User involvement, continuous support and information sharing, Strong Departmental leadership, development of SU	(Dunnigan et al., 2010)
EHR Electronic Health Records System	USA	Quantitative	Extra support, learning modes, shorter gaps in training, timing, continuous learning and upgrade	(Karuppan & Karuppan, 2008)
EHR Virtual Health Record (VHR)	Sweden	Qualitative Case Study	Start-up seminars (user expectations, perceived behavioural control), End User education, continuous follow up and support, user participation	(Hägglund et al., 2006)
EIS Enterprise Information System (development)	Norway	Qualitative Interviews	Central role in system adoption, ambassador, provided training and support	(Klemets & Storholmen, 2020)

EIS Enterprise Information System	Denmark	Qualitative Interviews	Positive frames	(Hertzum & Torkilsheyggi, 2019)
EIS Enterprise Computer Information System	China	Qualitative	Cross boundary knowledge management, identity expansion and negotiating various stakeholders' interests, creating liminal knowledge space, shared knowledge, and knowledge transformation	(Pan & Mao, 2013)
EIS Enterprise Information System	Norway	Qualitative Case Studies	Active involvement in changes, proactive support	(Sannarnes, 2010)
EIS Computer Information System (CIS)	USA	Quantitative	Super User perception about qualifications: care outcomes and implementations process predicted employee attitudes, positive frames, Sper User attitude towards CIS predict employee experience, time spent in Super User role (hours/week in role), positive attitudes	(J. R. Halbesleben et al., 2009)
EIS Enterprise Information	Norway	Qualitative Interviews and Case study	Mediators between users and IT, depth of explanation, network of Super	(Asand & Morch, 2008, 2006)

System (Finance)			User, End User activities	
EIS Computer Information System (CIS)		Qualitative	End User involvement, continuous support and information sharing	(Boffa & Pawola, 2006)
EMR Medical Treatment Planning System (Raystation)	Canada	Qualitative Interviews	Multidisciplinary leadership implementation strategy, proactive communication, shorter training to clinical lead time, creation of relevant practice cases	(Dhillon et al., 2021)
EMR Health Information System (HIS)	Denmark	Systematic Literature review	Ongoing training and proactive support, training should be related to practice and address individual learning needs, Super User change facilitation	(Bygholm, 2018)
EMR Electronic Medical Records System	Saudi Arabia	Qualitative	Super User Training	(Othman et al., 2019)
EMR MS SQL Patient Admin System	Ireland	Qualitative Case Study	Information sharing, proactive involvement, technical skills, training structured, extra support, timely problem solving, IT and business alignment, Super User focus groups	(Owens, 2009)

EMR Electronic Medical Records System	USA	Qualitative Case Study	Training plans utilizing patient scenarios, practice playground environment, training availability scheduling, Super User recruitment and development well in advance, management support in users' training availability, additional time and extra support, users' prior computer and IS knowledge, early involvement, initial educational sessions	(McIntire & Clark, 2009)
ERP Enterprise Resource Planning System (manufacturing)	Denmark	Case study. Explanatory	Technical: Adopt and learn new technologies, ERP knowledge and skills, English skills, computer/IT skills. Human: Negotiate and handle conflicts, Influence motivate and direct end users, work in team, form and maintain working relationships with co-workers, find creative solution to any issue Super User might encounter, teaching and training skills, manage change resistance. Conceptual: structure and plan work towards long term	(Obwegeser et al., 2019; Danielsen, Hansen, et al., 2017)

			goals, handle crisis, ability to define determine evaluate and select among different solutions to a problem, coordinate and organize daily tasks	
ERP Enterprise Resource Planning System	Iran	Mixed Methods	Technical, Human, Conceptual skills. Large companies' vs Small and Medium Enterprises	(Mahdavian & Mostajeran, 2013)
ERP Enterprise Resource Planning System manufacturing	Multinational	Quantitative	Information sharing, communication, depth of explanation, positive frames	(Larsen, 2009)

The summary given below of this up-to-date literature review on Super User characteristics and selection criteria shows interesting trends. It identifies areas of researcher interest, implemented system types, preferred methodological approaches and focus of interest.

Implemented Systems: Many studies that explored Super User characteristics originated in the health sector with implementations of EMR, EHR and other health-related EIS. Several studies were conducted in manufacturing, financial and accounting areas.

Country: Geographical areas of the studies is diverse with several studies done in USA, Denmark, and Norway. Other countries such as Canada, UK, Sweden, Saudi Arabia, Iran,

and China were represented by one study each. Note that most of the interest in Super User research in the past 4-5 years was expressed through research in European countries.

Publication date: Only 6 studies were published on Super User characteristics and selection criteria in the past 5 years and 14 studies in the past 10 years. According to the search engine results, the first study was published in 2006 and the most recent in 2022.

Methodology: An overwhelming number of the studies was carried out by employing qualitative research methods, such as semi-structured interviews or case studies. Some case studies involved an explanatory analysis of interviews, and two studies were mixed method design. Only two studies were quantitative and just one systematic literature review.

Super User Characteristics and Selection Criteria: Super User characteristics and selection criteria did not seem dependent on any other variable and concerns expressed were similar regardless of the research country of origin, industry or implemented EIS system. Table 3 summarizes the most common Super User characteristics and selection criteria summarized by frequency of use.

Table 3. Super User Integrative Characteristics Summary

Integrative Characteristics		**Frequency of Use**
Support	Instrumental, emotional, proactive, continuous, extra, management	14
Training	Shorter lead times, Super User, skills, ongoing, related to practice, address individual needs, comprehensive, structured, plans using case scenarios, availability scheduling, shorter gaps	13

Skills	Technological, pedagogical, systems, English, Computer/IT, training, conceptual, technical, human	9
Learning	Culture, collective, individual, needs, modes, continuous, by doing	8
Proactiveness	Communication, support, involvement	7
Positivity	Attitude, communication, frames	5
End User Development	Involvement, activities, education	4
Teaching	Skills, strategies	2
Development	In advance, Super User	2

Table 4. Super User Most Used Characteristics Summary

Most Used Characteristics		**Frequency of Use**
Information Sharing	Collective and Individual	7
Depth of Explanation	Why it happened, explaining logic behind the actions	5
Proactive support	Offering assistance proactively, going around asking questions like are you comfortable? Any questions?	4
Extra Support	Additional support in training, practice and mastery	4

The findings show that integrative skills in Learning, Training and Support vary in their focus and that attention was given to intensity (emotional), specificity (individual needs), amount (extra), availability (scheduling) and other case-specific Super User characteristics.

From the frequency of findings and interest point of view, the most used Super User characteristics were information sharing, positive frames "definitions of organizational

reality that serve as vehicles for understanding and action" (Yuan et al., 2015; Gioia, 1986), depth of explanations, proactive support, extra support and continuous support.

Findings of (Mahdavian & Mostajeran, 2013) showed that Super User characteristics and selection criteria for large companies might differ substantially from Super User characteristics in SMEs (Small and Medium Entgerprises). Research of (Obwegeser et al., 2019) showed that Super User language proficiency was an important factor and ability to convey and understand the message properly was attributed to English language skills.

(McIntire & Clark, 2009) emphasized the importance of Super Users creating a "practice playground environment" for effective learning and knowledge transfer. (J. R. Vaag et al., 2022; J. R. Vaag & Sætren, 2021) brought attention to the importance of negotiations of roles and responsibilities between the Super User and Management. They formulated two categories that management and Super Users should focus on: Learning culture category and Individual learning category.

Classification of Super User Characteristics on Human, Technical and Conceptual skills (Mahdavian & Mostajeran, 2013) with further development of a Super User selection model (Danielsen et al., 2017; Obwegeser et al., 2019) identified Super User skills gaps and weak areas and focused on specific areas for SU development and selection.

The concept of knowledge space, cross-boundary knowledge, collective sharing, and collective learning was mentioned in several studies (Dunnigan et al., 2010; Obwegeser et al., 2019; Pan & Mao, 2013; Skok et al., 2013; J. R. Vaag et al., 2022). These findings underline the importance of collective spaces for knowledge and skills learning exchange.

Close attention was paid to Super User support in relation to End User Development by (Asand & Morch, 2008; Boffa & Pawola, 2006; Dunnigan et al., 2010; Hägglund et al., 2006) in connection with involvement, activities and education.

Overall, as pointed out by (Verhoef, 2021), inadequate User Training and Support from Super Users, unmet user expectations and low User Satisfaction are the crucial factors contributing to increases in integrative systems implementation and digital transformation failure rates (Arasanmi, 2019). Fundamentally, if users don't understand how to use the new or upgraded system, or if they don't receive adequate support, they may not use the system effectively, reducing the benefits available from appropriate use of the EIS (Kenge & Khan, 2020; Shafi et al., 2019).

2.4 Chapter Summary

Chapter 2 is a detailed literature review of academic publications about Super Users. Based on the published literature, the concepts of Super Users, different types of EIS and the User Satisfaction construct were discussed. The role of Super User was evaluated following PRISMA guidelines for systematic literature reviews, and the findings were presented and discussed. It was found that although the PRISMA search on interchangeable terms of Super User, Key User, Expert User and Power User yielded a large number of articles, the vast majority of the articles with search terms of Key User, Expert User and Power User were not relevant to the research topic and objectives. The thorough literature review revealed the overlapping terms issue and allowed narrowing down the existing literature and focusing on the scope of the study. Chapter 2 summarized the most important and frequently used characteristics of effective Super User support. The role of Super User

support and effectiveness was discussed as a contributor to and integral component of user satisfaction.

3. Theoretical Foundations

The purpose of EIS and integrative technologies is to integrate organizational data and information in one platform. EIS are viewed as complex efficient integrative mediums that require high technical skills and could be intimidating at the first sight. However, as complex as EIS systems can be, they are also highly efficient and provide a variety of collaborative features for users to ease user learning curves, and to increase user performance and satisfaction with a Super User facilitated implementation process.

The collaborative aspect of integrative technology was not explored in the literature nor explained by any model yet so this chapter provides a theoretical foundation that will be utilized to develop a model that can closely describe the uses and benefits of the collaborative features of integrative platforms. Such collaborative features should be understood by organizations and provided to the users in a way that facilitates Super Users implementation during EIS implementations.

Three main research streams are utilized in this study in order to develop a suitable research model of user satisfaction with Super User facilitated EIS implementations. Those three theoretical backgrounds explain: first, the collaborative features of integrative systems that should be undertaken for users by Super User facilitation during EIS implementation. Collaborative technology research, Social Presence and Channel Expansion theories provide a solid background for modeling positive effects of collaborative technologies on user performance. Second, based on Technology Adoption Research, Super User facilitation should guide users to a realization of the effects of collaboration technology use

on increased technology adoption due to increased performance. Third, the Expectation Confirmation model provides organizations with an understanding of Super User effectiveness in facilitating EIS implementation through user perceptions of performance and Super User facilitation, user expectations and confirmation of expectations. This in turn leads to a user EIS implementation process that reflects their satisfaction or dissatisfaction.

3.1 Collaborative Technology and Technology Adoption Research

The Collaborative Technologies Integrative Model that integrates Collaborative Technology and Technology Adoption research was developed in 2010 (Brown et al., 2010). This theory explains the adoption and use of collaborative technologies that utilize research on social presence and channel expansion theories in conjunction with task closure models. It was found that collaboration-related antecedents of social presence and channel expansion predict the performance expectancy constructs as predictors of collaboration technology use. Current research suggests that collaborative technology-related constructs are associated with Super User effectiveness through Performance Expectancy, and that perception of facilitating conditions predict user satisfaction with EIS-collaborative technology and Super User related support. A literature review on Collaborative Technology is presented below.

3.1.1 Collaborative Technology Research

Research on Super Users is grounded in collaborative technology research. (Dennis et al., 1988) defined a new term for one of the technologies supporting systems - EMS (electronic meeting systems). The research claimed that EMS-facilitated group decision support is

effective not only as a group decision making support system, but also as a communication tool, significantly enhancing employee collaboration and organizational performance. Satisfaction with EMS, as one of the process outcomes, would depend on various characteristics including group and individual characteristics (Dennis et al., 1988; D. Compeau et al., 1999, 1999; D. H. Compeau Christopher A., 1995a, 1995b).

Another important factor in collaborative technologies is media ability to support synchronicity, "a shared pattern of coordinated behaviour among individuals as they work together" (Dennis, 2008). Following the synchronicity concept, communication arises from two processes: conveyance and convergence. Familiarity of individuals with their coworkers affects process outcomes and use of media that supports higher synchronicity should result in better communication performance for convergent processes (J. R. Carlson et al., 2017; J. R. Carlson & Zmud, 1999, 1999).

The concept of social presence embedded in an integrative model of collaborative technology and technology adoption (Brown et al., 2010) was developed by (J. Short et al., 1976). Social presence was defined as "…the degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships…" (Short, 1976).

A classic example of a high Social Presence is face-to-face communications (Biocca, 2013). During face-to-face communication, the individuals are using not only verbal expressions to convey a message, but also non-verbal cues such as gestures, facial expressions etc. Use of different means to convey a message contributes to better connectedness and richer communication experiences. In a context of information

technology, Social Presence theory focuses on an individual's sense of being present while using technology. It explores the degree of awareness individuals have of each other in communication interaction, quality of communication through their technology channels and how this technology-mediated communication impacts the individual's perception of social presence. Higher levels of social presence while using technology has been found to lead to more effective communication, engagement and learning.

Certain studies have explored various features utilized by technologies to increase individual perception of social presence while using the technologies. One of the examples involves a visual representation of a communication partner. Addition of video, audio, or avatar features have resulted in an individual's higher sense of social presence, as compared to using simple chat or text messages (Appel, 2012; de Greef, 2001; Homer, 2008; Jung, 2017; E. J. Lee, 2013). Also, how realistic the associated images are (S.-H. K. Kang H. W. J. ;. Kanth, Sasi, 2008; S.-H. W. Kang James H., 2013; Shahid, 2012; Fasolino, Tracy, 2014) and degree of realism (Gong, 2008) has contributed to various levels of social presence perceptions.

The level of interactivity achieved by social agents (Skalski, 2007), such as synchronicity (Park, 2015; Qin, 2013), internal communication features (Rauwers, 2016), dialogic vs monologic (Lim, 2017), haptic feedback (K. M. J. Lee Eui Jun; Park, Namkee; Ryu, Seoung-Ho, 2011; M. B. Lee Gerd; Welch, Gregory F., 2017), depth cues (Ahn, 2014), audio quality (Skalski, 2007) or display (James, 2011) have been found to increase or decrease individual perceptions of social presence.

Contextual properties can also differentiate and enhance the sense of realness and perception of social presence through agency (Felnhofer, 2014; Kothgassner, 2017; von der Pütten, 2010), virtual human vs real human (Han, 2016; S.-A. A. Jin, 2012; S.-H. K. Kang H. W. J. ;. Kanth, Sasi, 2008), and social cues (Choi, 2001; Kim, 2014) or task type (de Greef, 2001).

In the case of integrative technologies, a sense of social presence could positively influence individual collaborative and coordinating skills. The observer vs player vs collaborator, and perception of the medium as a collaborator vs competitor (Herrewijn, 2015; Z. L. Wu Jinhui; Theng, Yin-Leng, 2015) could alter the individual's perception of social presence while using a technological medium.

Social presence influences how social interaction affects learning outcomes (Tu and McIsaac, 2002; Zhaoetal.,2014). It has been found that social presence affects group learning and group dynamics via social interaction (Tu, 2000). Social interaction may also strengthen social presence (Song and Yuan, 2015). (Poth, 2018, p.89) found that "determining how to develop an individual's social presence within the learning environment is key to promoting a more engaging and supportive educational experience".

Channel expansion theory (CET, Carlson & Zmud, 1999) focuses on the role of experiential factors with technological communication channels, communication participants, messaging topics, and organizational context. CET is basically an extension of media richness theory (Daft & Lengel, 1986) that describes the technological medium's ability to reproduce closely the information sent over it. CET provides an additional individual factor

that allows better understanding of individual and group perceptions of richness of the technological channel. It claims that individual experience serves an important role in determining the level of perceived richness and development towards certain technology mediums. CET, along with social presence theory (Short, Williams, & Christie, 1976) facilitates research in understanding the reasons behind communication behaviors and preferences.

The latest research on CET has explored individual experiences in contemporary contexts of artificial intelligence, metaverse, zoom and other videoconferencing tools as well as in a context of leadership and well-being ((Banks et al., 2022; Beckel & Fisher, 2022; Brucks & Levav, 2022; Döring et al., 2022; Dwivedi et al., 2022; Nesher Shoshan & Wehrt, 2022; Samuel et al., 2022). In an integrative technological context, prior experiences with integrative technologies as well as experience with the tasks and functional areas would facilitate individual perceptions of integrative technology as a richer technology channel.

A key contribution of Carlson's and Zmud's (1999) work illustrated how the construct of experience is conceptualized. In a classical view, experience could be defined as previous use, interaction, membership, or knowledge of any kind. With CET, experience is a much more sophisticated construct. Experience is defined on a continuum where the nature of usage, or knowledge base with a subject, organization, channel, or communication partner is developed over time or through intense use, involvement, or interaction. By providing these additional levels of experience definition, CET allows for a range of perception richness for a particular medium, not only through these four conditions, but also through the duration and intensity of these experiential conditions. In EIS implementation research,

user perception of EIS as a rich social medium, provides users with an opportunity to utilize the collaborative features of EIS. It allows users to utilize EIS collaborative synchronicity. It allows users to develop a feel of social presence while interacting with EIS that claims to lead to effective communication, engagement and learning.

3.1.2 Technology Adoption Research Constructs

Technology adoption constructs utilized by this research are Performance Expectancy and Facilitating Conditions (Brown et al., 2010; Venkatesh et al., 2003a). These constructs are derived from the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003a). Performance expectancy is defined as "the degree to which an individual believes that using the system will help him or her to attain gains in job performance. Facilitating conditions are "the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the systems" (Venkatesh et al., 2003a). UTAUT integrated existing elements across eight different models of information technology acceptance research and explained IT acceptance from eight different perspectives originating in theories of information systems, psychology and sociology research. The eight models integrated into this single framework were the theory of reasoned actions (TRA), the technology acceptance model (TAM), the motivational model, the theory of planned behaviour, the model combining technology acceptance and the theory of planned behaviour, the model of PC utilization, the innovation diffusion theory and the social cognitive theory, as discussed below.

The Performance Expectancy construct comes from social cognitive theory (Bandura, 1986) with further application of the theory to computer utilization (D. Compeau et al.,

1999). Facilitating conditions came from the model of PC utilization (Thompson, 1991) derived largely from (Triandis, 1977) human behavior research.

Constructs of Performance Expectancy and Facilitating conditions were utilized in the two–stage information systems continuance model (Venkatesh et al., 2011) to examine the IS continuance intention and user satisfaction with electronic government technologies. User satisfaction and continuous intention have also been explored in a context of mobile technologies (Santosa, 2021; Lutfi, 2022), telemedicine (Rahi, 2021) and internet banking (Rahi, 2021).

3.2 Expectation Confirmation Theory (ECT)

Expectation confirmation theory is a cognitive theory that explains "consumer satisfaction as a function of expectation and expectancy disconfirmation. Satisfaction, in turn, is believed

to influence attitude change and purchase intention" (Oliver, 1977) (Oliver, 1980). In other words, customer repurchase intentions, according to ECT, are mostly determined by their satisfaction (Oliver, 2014) with previous use of the product or service (Anderson & Sullivan, 1993). Customers who are satisfied are more likely to purchase again, but those who are dissatisfied are less likely to do so (Dwyer et al., 1987). The user view of the congruence between a product or service's pre-consumption expectation and its post-consumption perceived performance is known as confirmation. Pre-consumption expectations and post-consumption confirmation levels are indicators of customer satisfaction. Positive confirmation (perceived performance exceeds expectation), confirmation (perceived performance equals expectation), or negative confirmation

(perceived performance falls short of expectation) are all possible outcomes. Customers might use expectations to measure their level of satisfaction. If confirmation happens, satisfaction rises or falls relative to the reference point.

ECT theory has been applied in information systems to understand information system continuance (Bhattacherjee, 2001). Confirmation in that model represented an exogenous post adoption variable that affected IS continuance intentions through Perceived Usefulness and Satisfaction.

Since the development of ECT theory, it has been utilized in a variety of contexts such as consumer loyalty and product repurchase (Oliver, 1999; Spreng et al., 1996)), knowledge sharing and self-efficacy (X.-L. Jin et al., 2013) and service satisfaction and continuance (Khalifa & Liu, 2002; Lin et al., 2009; Susarla et al., 2006). Consumer behavioral intentions have been explored in service environments (Nunkoo et al., 2020) and chatbots in banking industry (Eren, 2021) through quality, value and customer satisfaction (Cronin Jr et al., 2000).

3.3 Research Gap

The literature review revealed that there is limited research available on Super User characteristics and effectiveness, and there have been virtually no comprehensive studies done to understand the critical role of Super User support in organizational digital transformation efforts. Considering the fact that organizational digital transformation efforts typically have high failure rates (Ramesh & Delen, 2021), it is of high importance to bring Super User effectiveness research into the light, so its potential can be better

understood. In my study I am not only trying to bridge the gap in Super User effectiveness research, but to explore new dimensions to the Super User role as an effective means of understanding and facilitating user perceptions of integrative systems as efficient collaborative and business coordinating mediums. Creating user senses of social presence can positively influence learning about new or upgraded integrative systems through individual and group learning. This study will attempt to infuse the research on Super User support, user satisfaction and integrative technology implementation success with theories from social psychology that focus on the importance of user sense of social presence, along with individual and group learning.

3.4 Chapter Summary

In Chapter 3, major theories utilized in this study, including the Expectation Confirmation model, Social Presence and Channel Expansion theories, and technology adoption research were examined. The major gap in lack of understanding user frustrations with EIS technical complexity was identified. Novel ways of viewing EIS as a collaborative social presence medium was presented through a thorough literature review on collaborative technologies. Technology adoption research showed a strong connection between understanding of collaborative technology features, increased performance and technology adoption. Expectation Confirmation theory and research linked the confirmation of user expectations with user satisfaction and the implementation process. The role of the Super User is identified as crucial in facilitation of the user sense of social presence development.

This study claims that these theories provide the best explanation for the research questions that were posed by this research. These theories allow users to uncover the collaborative

features of integrative technologies, which in turn lead to an increase in user performance and satisfaction during an EIS implementation.

4. Research Model and Hypotheses

The research model developed in this study lies within the three theoretical concepts outlined in Chapter 3, representing the relationship between Super User effectiveness and user satisfaction.

4.1 Theoretical Model

The purpose of the model, based on theoretical concepts outlined in Chapter 3 (see Figure 2) is to add a concept of Super User support effectiveness to the relationship between User Expectations and Satisfaction. This model evaluates Super User support effectiveness from a new perspective involving Super User ability to facilitate the formation of user perceptions of social presence in the context of a new or improved integrative system as an effective business coordination and collaborative medium. It brings a new dimension to Super User research that positions a Super User as an effective means to introduce users to the social aspect of integrative technologies through the user's sense of human presence. Additional concepts of individual and group characteristics allow users with prior experience and ability to utilize the value of their working relationships through the collaborative space of integrative technology platforms.

This model suggests that Technology, Individual and Group characteristics are important constructs affecting user satisfaction in Super User-supported new or upgraded EIS learning during the EIS implementation processes.

Face to face interactions are considered to be the ultimate environment for social presence (Biocca et al., 2001). Future research will be needed to compare face to face communication

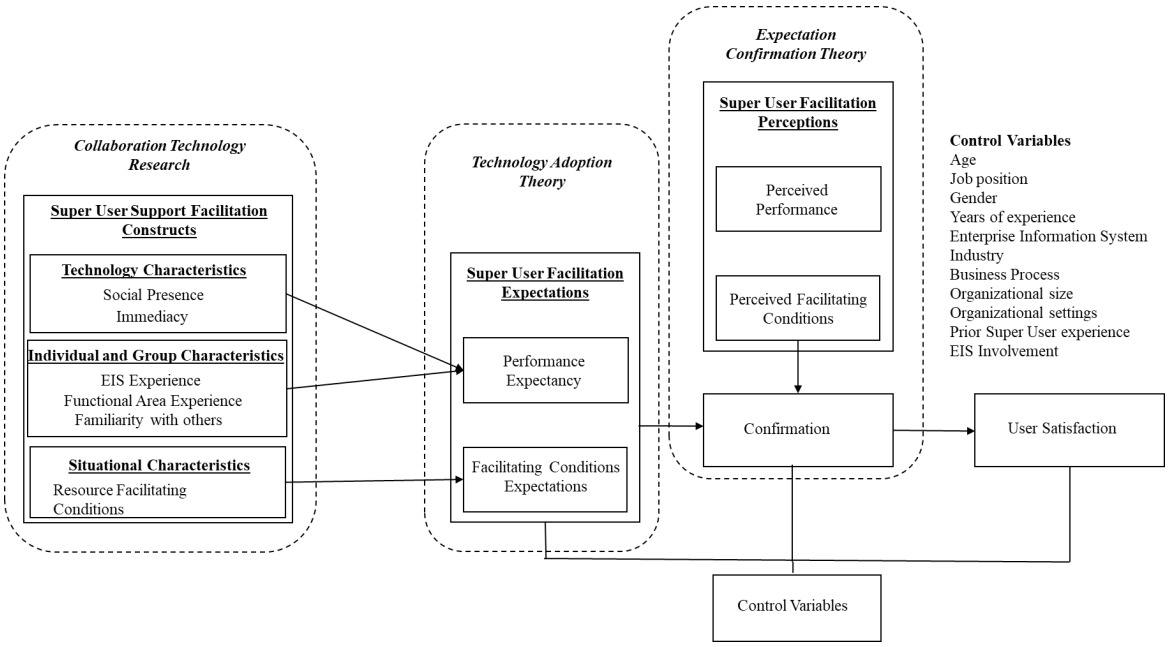
and collaboration with technology systems interfaces to determine how successful a given system is at establishing a social presence. Instead, this study focuses currently on the level of Super User effectiveness in establishing a user's feeling of social presence with EIS systems platforms.

A user feeling of social presence is established through Super User support by facilitating the formation of user perceptions of integrative technologies as a social presence medium for coordination and collaboration purposes.

In integrative technology implementations such as EIS, individual experience and group learning play an important role. Individual experiences with such integrative tools and functional knowledge areas could define the level of Super User effectiveness in providing support to users and facilitating knowledge transfer. User collaboration and coordination of business processes through new or upgraded EIS can play an important role in accurate business data integration. Success can be achieved only when all group members (organizational EIS users) are also successful as opposed to individual learning when success is achieved independently of others (Kreijns et al., 2022). Use of EIS integrative technologies implies adequate knowledge and contribution of all group members (organizational EIS users) in order to ensure the proper integration and flow of information from one department to another, from the beginning of the process until the end, for example from a purchase order to its payment and product delivery. The simplified model in Figure 4 depicts two important constructs of Super User support-related expectations: Performance Expectancy and Facilitating Conditions Expectations, as predictors of user satisfaction. Theory suggests that technology characteristics (e.g. social presence and

immediacy), as well as individual and group characteristics, (e.g. integrative technology experience, functional area expertise and familiarity with others) are factors that would influence the two constructs of performance expectancy and facilitating conditions expectations. The dependent variable of user satisfaction is presented as an outcome of confirmation/disconfirmation of user performance expectancy and facilitating conditions expectations before and after integrative technology implementation.

Figure 4 Simplified Research Model

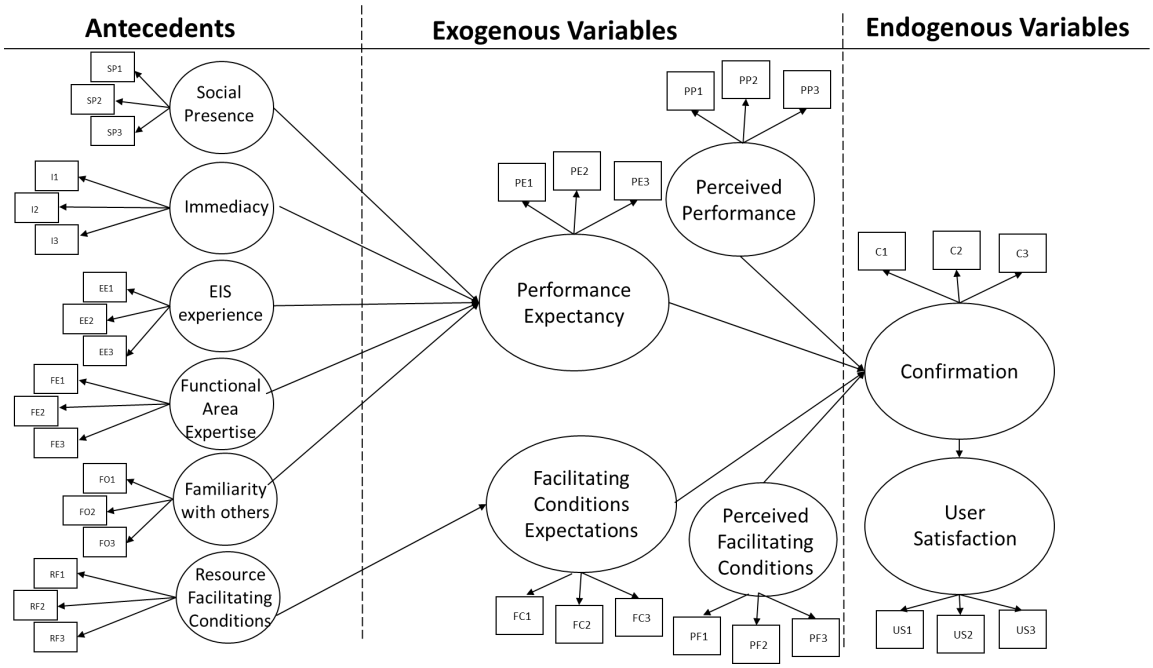


The study is intended to develop more understanding of user satisfaction and EIS collaborative capabilities in EIS implementation success that derive from the perspective of user expectations and confirmation of Super User facilitation.

4.2 Rationale for the Research Model

The research model depicted in Figure 3 is based on Expectation Confirmation (ECT), Social Presence and Channel Expansion theories that focus on exploring user satisfaction from Super User support-facilitated user performance expectancy and facilitating conditions expectations. A new or upgraded EIS in the proposed research model is viewed as an integrative technology and a coordinative and collaborative channel. Social presence theory allows an examination of Super User effectiveness in facilitating the formation of user perceptions of a new or upgraded EIS as an effective coordinative and collaborative tool for creating a user's sense of a new or upgraded EIS as a more positive and personal environment.

Figure 5 Research Model

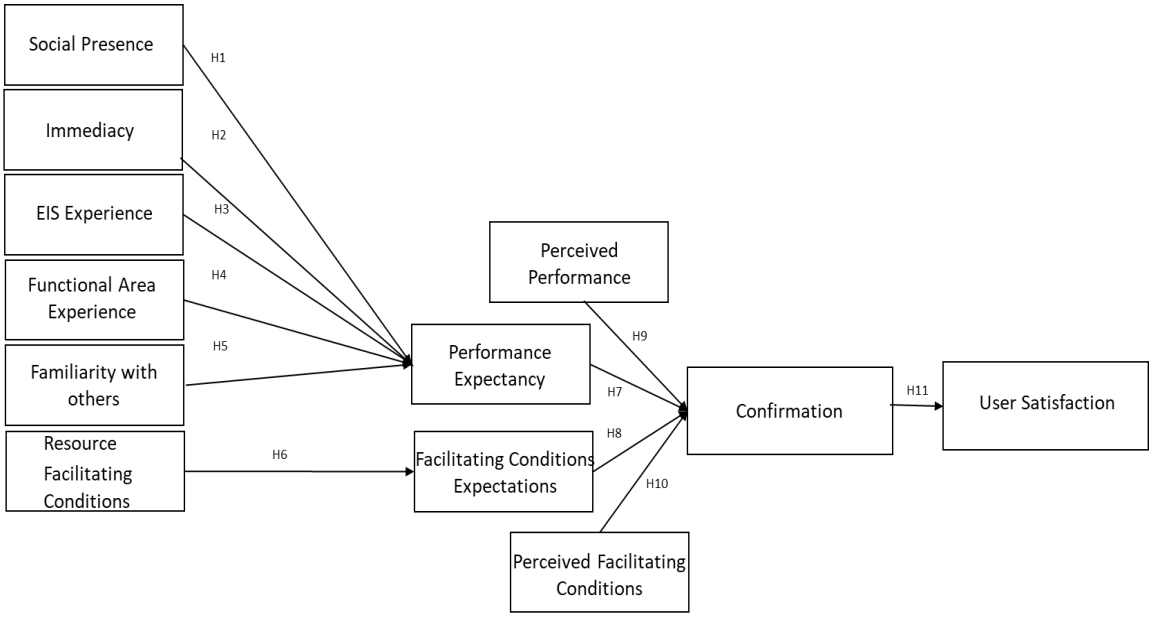


The background literature review brought to my attention the deficiencies in Super User research and the limited views of Super User roles. A major factor that was identified from the literature is user perspectives of Super User effectiveness as a critical factor in the EIS implementation process. Confirmation or disconfirmation of user expectations of Super User effectiveness can affect User satisfaction, contributing significantly to potential EIS systems implementation success.

4.3 Constructs and Hypotheses

There are 12 constructs and 11 hypotheses in this study (see Figure 6). In this chapter, I provide definitions and explanations of the constructs, followed by their hypotheses. A list of hypotheses is presented in Table 5.

Figure 6 Research Model with Hypotheses



4.3.1 Technology Characteristics

Integrative technologies enable organizations to integrate all their organizational data in one comprehensive platform. Besides the innate integrative physical characteristics, it also provides socially derived characteristics (Dennis, 2008; Fulk, 1993). As a comprehensive platform, EIS also enables users to utilize it as an effective means for collaboration and communication. However, due to the complexity of integrative systems, the socially derived features offered by EIS are rarely used as designed, thus underutilizing system capabilities and lowering organizational performance. Super User support is suggested to be an effective means to allow users to utilize socially derived characteristics of integrative systems. Socially derived characteristics, such as Social Presence and Immediacy (Dennis, 2008; J. R. ; Z. Carlson Robert W., 1999) are defined below.

Social Presence

Social Presence is a construct that focuses on the extent to which individuals perceive a sense of being present and connected in technology mediated environments. It reflects the degree of awareness individuals have of each other in a collaborative or business coordination environment and how this awareness impacts their perceptions of social presence. It has been suggested that higher levels of social presence, such as face-to-face communication (Short, 1976) lead to more effective engagement (Hew et al., 2023; W.-H. S. Tsai et al., 2021). Social presence has also been associated with perceptions of performance and user satisfaction in previous research (Christie, 1985; Fowler, 1980; J. W. Short Ederyn; Christie, Bruce, 1976). However, present research does not look at these constructs from a decision-making perspective, but more as an integrative medium with

collaborative and coordinative abilities as a perception forming factor. This study contextualizes these constructs to Super User-facilitated expectations and links them directly to Super User characteristics and effectiveness research.

A Super User facilitated user sense of social presence is hypothesized to positively affect user performance expectancy. The study suggests that effective Super User support in facilitation of the formation of user perceptions of integrative technologies is an efficient social collaborative and coordinating medium that will positively affect user performance expectancy. In other words, if users, guided by Super Users, develop a sense of connectedness with their coworkers, they will be open to collaborate and coordinate their work with their colleagues, thereby utilizing the advanced beneficial features of the new or upgraded integrative technology. Exploring and learning the technology together, and uncovering new or upgraded features, benefits and capabilities will contribute to user performance expectancy, leading to:

> ***Hypothesis 1:*** Super User-facilitated user sense of social presence will positively influence Performance Expectancy among EIS users.

Immediacy

Immediacy refers to the extent that integrative technologies can enable the user to quickly collaborate and coordinate with others (Dennis, 2008; Rice, 1987). The concept comes from a task closure model of media selection (D. W. ; K. Straub Elena, 1998) suggesting that individual decision making aided by technology is based on the technology's ability to assist users to reach out to other users and complete a task at hand quickly. In case of

organizational integrative technologies, users do not have a choice in decision making to select a particular type of integrative technology. However, the immediacy construct constitutes an important criterion leading to better efficiency and effectiveness. Quick collaboration and coordination between the users could allow them to act quickly and potentially save thousands if not millions of dollars per year in timely troubleshooting or effective business unit coordination. Thus, the immediacy of the social presence medium is also a very important factor in integrative systems user satisfaction.

Super User facilitation of new or upgraded system learning and collaboration while utilizing the new or upgraded tool will help users to connect and collaborate with their coworkers faster. Faster responses, coordination, and troubleshooting would lead to increased productivity and performance. Super User-facilitated user sense of Immediacy is hypothesized to positively affect user performance expectancy. Thus, we have:

> ***Hypothesis 2:*** Super User-facilitated user sense of Immediacy will positively influence Performance Expectancy among EIS users.

4.3.2 Individual and Group Characteristics

Individual and Group Characteristics impact user satisfaction because different individuals and groups have different needs (Dennis, 1988, 2008). These Characteristics focus on three factors that are suggested to have an impact on Super User effectiveness and user satisfaction. The three factors are presented by two individual characteristics - technology experience and functional area experience, and one group characteristic – familiarity with others.

Technology Experience

Technology experience represents an individual user's ability and experience in using a specific type of technology that will result in forming the user's perception of this and similar technologies. (J. R. ; Z. Carlson Robert W., 1999; R. L. ; L. Daft Robert H., 1986; Reinsch, 1990) EIS technologies are complex integrative platforms and acquisition of skills and knowledge with Super User support usually takes time and effort. However, nowadays, the majority of organizations already possess some type of integrative technologies and new or upgraded EIS implementations usually represent either upgrades to similar technologies with higher capabilities or acquisition of higher capabilities from different EIS that would fit an organization's strategic goals better. Therefore, a user's prior familiarity with similar technologies or earlier versions of the same EIS can help in determining the user's perception of integrative technology as a social presence medium and a resulting increase in user efficiency.

Super User-supported EIS or any other integrative technology experience would contribute to a faster transition to a new or upgraded system. Despite previous experience with the functional interface, system logic, capabilities and data flow, with the support of a Super User, users will be able to learn and acquire additional knowledge faster and increase their performance. As research suggests, with Super User support, even without prior integrative technologies experience, it would be expected that user performance and productivity would be higher even at the early stages of implementation and learning. This discussion results in:

Hypothesis 3: User integrative technology experience will positively influence Super User-facilitated Performance Expectancy among EIS users.

Functional Area Expertise

Functional area expertise is defined as a user's belief in his or her ability in their professional functional area expertise to accomplish tasks on an integrative technology platform. Functional area expertise can also affect user perceptions of performance expectancy, since inadequate functional area expertise can hinder user performance, irrespective of their familiarity with the specific integrative technology.

Functional area expertise implies that the user knows their functional area very well. Those users who have expertise in their functional area would be able to apply their knowledge to what they need to know and to ask Super User appropriate and specific questions, while learning related technical system capabilities. While there will still be a learning curve to get skilled in new or upgraded system use, overall user performance will progress faster and higher productivity will be achieved. Thus, performance will be higher with Super User-supported functional area expertise, leading to:

Hypothesis 4: User functional area expertise will positively influence Super User-facilitated performance expectancy among EIS users.

Familiarity with Others

Participants familiar with each other are more likely to be satisfied using integrative technology to facilitate group learning and to communicate richer messages than those who

lack familiarity with each other. In integrative technological implementations such as EIS implementations, individual experience and group learning are likely to play an important role. Individual experiences with integrative tools and functional knowledge areas as mentioned before could support or hinder the level of Super User effectiveness in providing support to users, thus facilitating knowledge transfer or forming user perceptions. Furthermore, user collaboration and coordination of business processes through new or upgraded EIS play an important role in accurate business data integration. Success is achieved only when all group members (organizational EIS users) are successful as opposed to individual learning when success is achieved independently of others (Kreijns et al., 2022). Use of EIS integrative technologies implies an adequate knowledge and contribution of all group members (organizational EIS users) in order to ensure proper integration and flow of information from one department to another, from the beginning of the process until the end, (e.g. from the purchase order to the payment and product delivery). Thus, familiarity with other users could affect a collaboration and user performance expectancy.

User familiarity with co-workers would help to utilize the personal connections faster within the new or upgraded integrative system collaborative environment. Positive personal relationships would create more collaborative system experience. User familiarity with others and positive collaborations in an integrative system interface will lead to increased productivity and performance, giving:

> ***Hypothesis 5:*** User familiarity with others will positively influence Super User-facilitated performance expectancy among EIS users.

4.3.3 Situational Characteristics

Situational characteristics represent the context in which the collaboration technology is implemented. Situational characteristics that users experience at the organizational level include incentives, organizational culture, how extensive technology use is encouraged (Bajwa, 2008) etc. For example, innovative companies would encourage their employees to think outside the box and use the technology extensively, while less innovative and traditional companies might not encourage explorations and extensive technology use. Innovative companies might even provide incentives and rewards for extensive technology use, which will contribute further to employee perceptions of organizational resource availability and support (Bajwa, 2005, 2008; Pervan, 2005). In this study, we view organizational Super User support effectiveness as a contributor to user perceptions of Facilitating Conditions.

Resource Facilitating Conditions

Facilitating Conditions in the context of user satisfaction refers to the extent to which various situational factors, such as User Support effectiveness in new and upgraded EIS implementations, affect user satisfaction. Facilitating conditions has been referenced as a situational factor in technology adoption (Venkatesh et al., 2003b). As presented by (S. T. Taylor Peter A., 1995), resource-facilitating conditions contribute to the perception of facilitating condition and it increases with increases in resource availability. In the context of this research, user perceptions of facilitating conditions increase with increases in Super User support effectiveness.

Resource Facilitating Conditions are the resources that the organization provides to the users. Organizational support includes the Super User support in implementations of new and upgraded EIS. Effectiveness of Super User support affects user perceptions of Facilitating Conditions. More effective Super User support leads to a higher degree of user perception of Facilitating Conditions, leading to:

> ***Hypothesis 6:*** Super User as a Resource Facilitating Condition will positively influence perception of Facilitating Conditions among EIS users.

4.3.4 Expectations

Performance Expectancy

Performance expectancy is defined as *"the degree to which an individual believes that using the system will help him or her to attain gains in job performance"* (Venkatesh et al., 2003). This is the extent to which new or upgraded EIS systems are expected to improve user work productivity and performance overall (Brown et al., 2010). It has been a good predictor of behavioral intention across multiple technologies (Karahanna, 1999; V. Venkatesh et al., 2003) in addition to customer satisfaction (Elok & Hidayati, 2021).

Higher Performance expectancy from a Super User-facilitated integrative technology implementation will positively influence confirmation, resulting in:

> ***Hypothesis 7:*** User Performance Expectancy will positively influence user Confirmation of Performance Expectancy among EIS users.

Facilitating Conditions

Facilitating conditions are defined as "the perception regarding the availability of organizational resources to support use of the target system" (Venkatesh et al., 2003b; Brown et al., 2010). Due to the integrative nature of EIS, the absence of organizational resources to support the collaborative capabilities of this technology, or ineffective support of technology users of EIS collaboration capabilities, will have a negative effect on collaborative technology capabilities use. It will negatively impact user perceptions of facilitating conditions and user satisfaction.

Super User-related Facilitating Conditions Expectations from Super User effectiveness as a resource-facilitating condition is hypothesized to lead to Confirmation. Thus:

> ***Hypothesis 8:*** User Expectations of Facilitating Conditions will positively influence Confirmation of Facilitating Condition Expectations among EIS users.

4.3.5 Perceptions

Perception constructs indicate how user perceive their performance and facilitating conditions after EIS implementation and experience with the Super User. User Expectations of Performance and Facilitating Conditions might be similar; however, the Perceived Performance will differ and depend on specific Super User facilitation thus becoming an important factor influencing the Confirmation among the EIS users (Lin et al., 2009). In this model, perception has indirect relationships with satisfaction (Bhattacherjee & Premkumar, 2004; Eren, 2021; Lin et al., 2009) and reflects user-perceived values after the EIS was implemented.

Perceived Performance

Perceived Performance is how users perceive their performance after Super User support is being received. Positive perception of performance due to effective Super User facilitation will positively influence Confirmation. Negative Perceived Performance due to ineffective Super User facilitation will negatively influence user Confirmation of Performance.

User Perceived Performance is hypothesized to lead to positive Confirmation, and:

> ***Hypothesis 9:*** User Perceived Performance through Super User facilitation will positively influence Confirmation of Performance among EIS users.

Perceived Facilitating Conditions of user Performance

Perceived facilitating conditions are how users perceive their organizational support through Super User facilitation. If User Perceptions of Super User facilitation as organizational Facilitating Conditions is positive, it will positively influence Confirmation. User Perception of Super User facilitation as organizational Facilitating Conditions not helpful and negative, will negatively influence Confirmation. User Perceived Performance is hypothesized to lead to positive Confirmation Thus, we have:

> ***Hypothesis 10:*** User Perceived Facilitating Conditions through Super User facilitation will positively influence Confirmation of Facilitating Conditions among EIS users.

4.3.6 Confirmation and User Satisfaction

Confirmation

Confirmation is defined as user perceptions of the congruence (Bhattacherjee, 2001) between expectation of Super User support effectiveness and its actual performance and effort. Confirmation (disconfirmation) was first defined by ECT (Oliver, 1977, 1980) and widely used in the consumer behaviour literature to explore customer satisfaction. The confirmation (or disconfirmation) construct shows whether the user expectations and perceptions were confirmed or disconfirmed.

User Satisfaction

Research on User Satisfaction is important in understanding Information Systems (IS) implementation success. (DeLone & McLean, 1992) created a comprehensive taxonomy that consists of six major dimensions or categories, including system quality, information quality, use, user satisfaction, individual impact and organizational impact. Over the years, IS research has identified other equally important antecedents of IS implementation success such as system use, IS performance and IS effectiveness. Despite the high degree of prediction accuracy for IS implementation success that these antecedents have provided, user satisfaction still remains the most widely used predictor of IS implementation success (Vaezi et al., 2016).

Positive Confirmation from Super User-related Performance Expectancy and Facilitating Conditions Expectations will positively influence user Satisfaction, so the stronger the

Confirmation from Super User-related Performance Expectancy and Facilitating Conditions Expectations, the higher User Satisfaction will be. This leads to:

> ***Hypothesis 11:*** Confirmation associated with Super User facilitation will positively influence User Satisfaction among EIS users.

The research hypotheses are summarized and listed in Table 5.

Table 5. List of Hypotheses

	Model Hypotheses
H1	Super User-facilitated user sense of social presence will positively influence Performance Expectancy among EIS users
H2	Super User-facilitated user sense of Immediacy will positively influence Performance Expectancy among EIS users
H3	User integrative technology experience will positively influence Super User-facilitated Performance Expectancy among EIS users
H4	User functional area expertise will positively influence Super User-facilitated performance expectancy among EIS users
H5	User familiarity with others will positively influence Super User-facilitated performance expectancy among EIS users
H6	Super User as a Resource Facilitating Condition will positively influence perception of Facilitating Conditions among EIS users
H7	User Performance Expectancy will positively influence user Confirmation of Performance Expectancy among EIS users
H8	User Expectations of Facilitating Conditions will positively influence Confirmation of Facilitating Condition Expectations among EIS users
H9	User Perceived Performance through Super User facilitation will positively influence Confirmation of Performance among EIS users
H10	User Perceived Facilitating Conditions through Super User facilitation will positively influence Confirmation of Facilitating Conditions among EIS users
H11	Confirmation associated with Super User facilitation will positively influence User Satisfaction among EIS users

4.4 Chapter Summary

In Chapter 4, the proposed study and the rationale for the developed research model were discussed. To increase clarity of the illustrated model and to better understand the integrated model components, eleven constructs and their related hypotheses were outlined.

5. Methodology

Rationale

The purpose of this study is to understand the role of a Super User and Super User support effectiveness in proximity to user sense of social presence and perceptions of integrative technologies that supports collaboration.

This is a new dimension in Super User characteristics effectiveness research. My extensive literature review has identified critical research gaps. Based on this literature review, research questions have been posed and a research model was constructed.

Preliminary analysis was carried out through a quantitative pilot study with a smaller number of participants. The pilot study was necessary to ensure clarity of the information and correct perceptions of the survey questions by participants. The final study employed a larger pool of participants, resulting in a proper statistical data analysis of the model. Participant responses to several open-ended questions were also included to collect qualitative measures in the full data set.

The Methodology part is discussed in the next three subsections: Research Design, Measurement Instrument and Model Validation and Evaluation. Research Design in turn includes Sampling and Recruitment, Data Collection and Analysis, and Construct Measurement. The Measurement Instrument subsection includes Background Information and Survey. The Model Validation and Evaluation includes testing criteria for Measurement and Structural models. Before proceeding with the final data collection as

described in this chapter, a McMaster Research Ethics Board (MREB) application was filed and MREB certification of the study received.

5.1 Research Design

5.1.1 Sampling and Recruitment

Research participants were recruited by the *Zoho* research data firm. *Zoho* is a company that offers a software tool which helps to create, analyze and manage surveys. The company has an ability to tap into a large pool of potential participants residing in the United States and sample from a target audience having the employment backgrounds required by the survey. Participants were required to be EIS technology users who had been engaged in EIS implementations in the past.

To ensure that survey participants recruited by the research firm were qualified for this study, three additional screening levels were added in the beginning of the survey. The first screening level question was related to whether the individual had worked in organization that went through the EIS implementation process. The second screening level question was to identify what EIS systems their organizations had implemented, and the third screening level question was to identify who was facilitating the implementation process and helping the users. Several dummy answers were purposely added to the screening levels questions. If the participants weren't able to properly identify correct answers to the screening questions, it reflected their insufficient experience with the subject. They were immediately disqualified, and their participation was terminated. The recruitment company ensured that the participants were otherwise qualified and that the collected responses were complete.

To identify the appropriate number of participants, a power analysis was performed with the SPSS statistical software package. For a medium effect size of 0.25 and statistical power of 0.8, the sample size was determined to be 296 research participants.

Before proceeding with the full study, a preliminary pilot study was carried out with the help of the same research firm. Through the use of purposive sampling (Sarstedt et al., 2018), the pilot study provided an opportunity to identify errors, optimize the survey design if needed, and analyze the preliminary results to understand the relationships among the variables before the full study was carried out (Hulland et al., 2018).

The sample size for a pilot study is suggested to be 10 percent of the size of the full study (Connelly, 2008). Other studies suggest that the pilot be up to 100 data points (Hertzog, 2008; Whitehead et al., 2016). The research firm was able to collect 72 initial data points for the pilot study. Examination of the pilot study indicated no changes were needed in the full study, so all the pilot data were subsequently included in the full study analysis.

5.1.2 Data Collection

The data for all participants were collected online and anonymously. Each participant, after preliminary screening by the research company, was invited to complete an anonymous online survey of 5-10 min. duration. The total number of participants that attempted to complete the survey was over 1,000 people. The final number of participants that survived the screening process and completed the survey was 332. Each response was associated with an unique participant ID and IP address.

Research study data collected from the participants were extracted from the Zoho platform after data collection was completed, and entered into the relevant csv file for further input into the SmartPLS 4 data analysis software. SmartPLS 4 is a variance-based structural equation modeling (SEM) software that uses the partial least squares (PLS) path modeling method.

5.2 Measurement Instrument

The survey was used to gather measurements related to model constructs (see Chapter 4). After answering the screening questions, the qualified users were provided the exact definition of Super User as it is used in this study when they were answering the survey questions (see the following).

> ***"Super Users*** are regular employees who receive additional training in the use of a new or upgraded Enterprise Information System (EIS) to be implemented at the workplace, so that they can provide first-line technical support and training to their colleagues locally. Example of EIS are Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), Electronic Health Records (EHR), Human Resource Management (HRM), Electronic Documents Management (EDM) and any other enterprise information integrative system.
>
> Please recollect from your memory a specific EIS implementation process that you were involved in as a User. Pick the one that you remember the best and stay with it throughout the questionnaire. All the answers need to be related to the time of your experience, ex: Industry, position, age etc. at the time related to that specific experience."

The survey also included background, screening and open-ended questions. This resulted in a total of 52 questions: 36 questions that measured constructs, 13 demographic and background questions and 3 open-ended questions. Each participant was estimated to

average 5-10 minutes to complete the survey, subject to the length and depth of their answers to the open-ended questions.

5.2.1 Background questions

Interesting insights about the research model relationships could be obtained through the addition of control variables. Control variables are demographic and background information that might have an impact on the research variables. This research collected a plenitude of background information on research participants to understand a possible effect of those demographics on the endogenous variables. The information collected was of individual and organizational nature, such as age, gender, years of experience, position, familiarity with Super User role, organizational size, functional area etc. By analyzing the effect of those demographic and background factors, we were able to determine whether or not these individual or organizational characteristics would affect variable relationships that should have been analyzed, noted and considered for this and any future studies. A full list with the background information that was collected in the same survey, including the additional screening questions, is presented in Table 6.

Table 6. Summary of Demographic and Screening Questions of the Survey

Background Questions	**Available Responses**							
Your age bracket	< 20	20 - 29	30 - 39	40 - 49	50 - 60	> 60		
Gender	Female/Woman	Male/Man	Non-binary	Prefer to identify differently	Prefer not to answer			
Organization size (at the time of the new or upgraded EIS implementation)	Small (fewer than 50 employees)	Medium (50 - 250 employees)	Large > (more than 250 employees)					
Industry	Service	Food	Manufacturing	Health	Finance	Construction	Telecommunication	Other
Business Process	Administration	Finance	Procurement	Information Technology	Operations	Sales	Marketing	Other
Position	Management	Non-Management	Project Manager					
Years of Experience in your functional area field	< 1 year	1 - 5 years	5 - 10 years	10 - 20 years	> 20 years			
Degree of Involvement (participation at the time of the new EIS implementation)	Not participated	Participated in EIS Project Implementation Training	Participated in EIS Project Implementation Execution	Participated in EIS Project Implementation Planning and Execution	Part of the EIS Implementation Project Team			
Have you ever been involved in any other EIS implementation as a Super User?	Yes	No	Prefer not to answer					

Employment Status	Full Time	Part-Time										
What system was implemented	DBMS (Database Management System)	EAM (Enterprise Asset Management)	ERP (Enterprise Resource System)	CRM (Customer Relationship Management)	BI (Business Intelligence)	Other EIS (Enterprise Information System)	CPM (Corporate Performance Management)	EDM (Electronic Document Management)	EHR (Electronic Health Records)	SCM (Supply Chain Management)	HRM (Human Resource Management)	ECM (Enterprise Content Management)
Who helped you and other employees to get familiar with the new system functionalities and use, during the Information System Implementation:	Key User	Super User	Power User									

The results of the control variable analysis are presented in subsection 6.2.11 of Chapter 6 – Results and Data Analysis.

5.2.2 Construct Measurements

All this model's variables are reflective constructs. Reflective indicators are seen as functions of the latent construct, and changes in the latent construct are reflected in changes in the indicator variables. All the constructs of this study are shown in Table 7. The

constructs have been taken from respective studies, adapted to EIS implementation and measured on a seven-point Likert Scale.

Table 7 Construct Measurements

Construct	Prompts for Participants	Items
Performance Expectancy (V. Venkatesh et al., 2003)	The following questions ask about user expectations of Super User support related Performance Expectancy. Please indicate the extent to which you agree or disagree with each statement.	• Compared to not having Super User support, with Super User support I believe the new or upgraded EIS will be more useful for my job. • Compared to not having Super User support, with Super User support, using new or upgraded EIS will enable me to accomplish work tasks more quickly. • Compared to not having Super User support, with Super User support, using the new or upgraded EIS will help to increase my productivity.
Facilitating Conditions (V. Venkatesh et al., 2003)	The following questions ask about user expectations of Super User support related Facilitating Conditions. Please indicate the extent to which you agree or disagree with each statement.	• Compared to not having Super User support, with Super User support, I have the resources necessary to use the new or upgraded EIS. • Compared to not having Super User support, with Super User support, I have the knowledge necessary to use the new or upgraded EIS. • Compared to not having Super User support, with Super User support, a specific person (or group) is available for assistance with difficulties with the new or upgraded EIS.
Social Presence (Brown et al., 2010)	The following questions ask about user expectations of Super User support related Social Presence. Please indicate the extent to which you agree or disagree with each statement.	• Compared to not having Super User support, with Super User support, using new or upgraded EIS will help to create a warmer environment for collaboration. • Compared to not having Super User support, with Super User support, using new or upgraded EIS will help to create a more sociable environment for collaboration.

		• Compared to not having Super User support, with Super User support, using new or upgraded EIS will help to create a more personal environment for collaboration.
Immediacy (Brown et al., 2010)	The following questions ask about user expectations of Super User support related Immediacy. Please indicate the extent to which you agree or disagree with each statement.	• Compared to not having Super User support, with Super User support, new or upgraded EIS will enable me to more quickly collaborate work partners. • Compared to not having Super User support, with Super User support, when I will collaborate with someone using new or upgraded EIS, they usually respond more quickly. • Compared to not having Super User support, with Super User support, when someone collaborate with me using new or upgraded EIS, I will be able try to respond more quickly.
EIS Technology Experience (Brown et al., 2010)	The following questions ask about user expectations of Super User support related Technology experience. Please indicate the extent to which you agree or disagree with each statement.	• Prior to this Super User support, my experience with new or upgraded EIS was: None at all . . . Very extensive • Prior to this Super User support, my experience with technologies similar to new or upgraded EIS was: None at all . . . Very extensive • Prior to this Super User support, my experience with integrative technologies was: None at all . . . Very extensive
Functional Area expertise (J. Short et al., 1976)	The following questions ask about Super User support related Functional area expertise. Please indicate the extent to which you agree or disagree with each statement.	• Prior to this Super User support, I feel that I was already experienced with my functional area • Prior to this Super User support I was well-versed in the concepts associated with my functional area • Prior to this Super User support, I did not feel knowledgeable about my functional area
Familiarity with others (Brown et al., 2010)	The following questions ask about Super User support related familiarity with others. Please indicate	• Prior to this Super User support, I felt comfortable discussing personal or private issues with co-workers with whom I collaborate

	the extent to which you agree or disagree with each statement.	• Prior to this Super User support, I felt comfortable using informal communication (such as slang or abbreviations) with co-workers with whom I collaborate • Prior to this Super User support, overall, I felt I knew my co-workers well
Resource Facilitating Conditions (Brown et al., 2010)	The following questions ask about user expectations of Super User support related Resource Facilitating Conditions. Please indicate the extent to which you agree or disagree with each statement.	• Prior to this Super User support, I believed that there isn't sufficient access to use the new or upgraded EIS as a collaborative tool. • Prior to this Super User support, I believed that using the new or upgraded EIS as a collaborative tool is very resource intensive for me • Prior to this Super User support, I believed that I am not able to use the new or upgraded EIS as a collaboration tool when I need it
Perceived Performance (Lin et al., 2009)	The following questions ask about Super User support related Confirmation. Please indicate the extent to which you agree or disagree with each statement.	• I think now that support provided by Super User is reasonable • I think now that support provided by Super User works for me • I think now that support provided by Super User is worth using
Perceived Facilitating Conditions (Lin et al., 2009)	The following questions ask about Super User support related Confirmation. Please indicate the extent to which you agree or disagree with each statement.	• I think now that organizational support provided through Super User is reasonable • I think now that organizational support provided through Super User works for me • I think now that organizational support provided through Super User is worth using
Confirmation (Lin et al., 2009)	The following questions ask about Super User support related Confirmation. Please indicate the extent to which you agree or disagree with each statement.	• Compared to not having Super User support, with Super User support my experience with using new or upgraded EIS was better than I was expected. • Compared to not having Super User support, with Super User support the

		efficiency provided by new or upgraded EIS was better that what I expected. • Compared to not having Super User support, with Super User support in overall, most of my expectations from using new or upgraded EIS were confirmed
User Satisfaction (Oliver, 1977)	The following questions ask about Super User support related user satisfaction. Please indicate the extent to which you agree or disagree with each statement.	• I was very pleased with my overall experience with Super User. • I felt very confident with my overall experience with Super User. • I felt delighted with my overall experience with Super User.

PLS SEM works equally well with larger and smaller numbers of data points. So, possibly a smaller set of relevant data in this case might also have worked with PLS SEM (Gefen et al., 2011; Goodhue et al., 2006; Marcoulides & Saunders, 2006).

5.2.3 Open-Ended Questions

Three open-ended questions were asked of participants at the end of the survey. Short answer-type answers with feedback on the study subject, and additional information based on the participant's experience, helped to provide explanatory information on variable relationships. It also extended the factors and offered an insider view of Super User characteristics beyond the research study, paving the road to potential further study and future research. Open-ended questions are presented in Table 8.

Table 8. Open-Ended Questions

Variable	Question
Expectations	As a user, could you please share what other expectations of Super Users beyond what were listed above that you might have had in the beginning of the New or upgraded EIS implementation process?
Super User support	What activities can you recall about Super User support during the New or upgraded EIS implementation process?
User Satisfaction	What other factors related to Super User do you believe contributed to user satisfaction (or lack of it) after the implementation of the New or upgraded EIS?

After the main research data were analyzed and the outliers removed from the study, all the qualitative responses were analyzed using thematic analysis in *NVivo*[1]. The outcomes of this explanatory data analysis are presented in subsection 6.3 of Chapter 6 – Results and Data Analysis.

5.3 Outlier Analysis and Data Screening

Outliers are observations within a set of data that fall outside of the general scope of the other observations. Outliers can lead to the violation of underlying structures in research data and result in biased decisions. Outliers with extreme values on a single variable are called univariate outliers. To detect the presence of extreme values, the data were examined for the presence of global univariate outliers through interquartile range (IQR) analysis in Excel. The IQR method is helpful because it uses percentiles, which do not depend on a specific distribution. Additionally, percentiles are relatively robust to the presence of outliers compared to other quantitative methods. The IQR measured the spread of the

[1] NVivo is a software program used for qualitative and mixed-methods research.

univariate data points. It defined a first and a third quartile of the variable values spread and applied the 1.5 IQR rule that imposes limits on the acceptable range of variable measurements. The responses that were outside the limits were marked as univariate outliers in each variable.

Outliers with extreme values on a combination of variables are called multivariate outliers (Meyers et al., 2016). Multivariate outlier analysis was handled by Mahalanobis distance analysis. Mahalanobis distance measures the "multivariate distance" between each group of multivariate means. It was calculated and compared with the chi-square distribution. Mahalanobis distance analysis for multivariate outliers was performed in IBM SPSS statistical software. The responses that were below a p value of 0.001 were also marked and analyzed.

In addition to outliers, the data could contain responses that were not well thought out by participants, that also could introduce bias into the analysis results. Those responses usually consist of one chosen value for all responses, such as "I don't know" and/or questionnaires that were completed in extremely short times (less than a minute) that could also indicate the quality of that specific participant's response.

To avoid potential bias in results, after the data were collected, downloaded and coded, it was analyzed for inconsistency, missing data, out of range values, univariate and multivariate outliers and participant response speed, employing the methods outlined above.

5.4 Model Validation and Evaluation

Structural Equation Modeling (SEM), as demonstrated in Figure 4, was employed to analyze the data, determine the relationships between the variables and validate the research model. Partial Least Squares (PLS) methodology does not make data distributional assumptions (Chin, 1998; Chin et al., 2003), and allows performing confirmatory factor analysis (Gefen et al., 2000) and identifying relationships among the constructs (Meyers et al., 2016).

One of the important advantages of using PLS-SEM is to ensure exploratory or confirmation of theory, based on total variance along with predictions and explanation of relationships between exogenous variables with the endogenous variable of user satisfaction (Joseph F Hair Jr et al., 2017). PLS-SEM can be used for exploratory research or confirmatory research (Joe F Hair Jr et al., 2016; Hult et al., 2018).

There are two components in a structural equation model with latent constructs: structural model and measurement model. The structural model, also known as the inner model in the context of PLS-SEM, is the first component and depicts the relationships (paths) between the latent constructs.

Measurement models, also known as outer models in the PLS-SEM setting, make up the second component of the structural equation model. Each latent construct and associated observable indicators are connected in a unidirectional way.

5.4.1 Measurement Model

The analysis of coded and cleaned data started with the analysis of the measurement model for reliability, validity and multicollinearity. Reliability analysis provides insights on whether the measurements items are consistent in measuring the corresponding construct (Pedhazur & Schmelkin, 2013). Reliability of the measurement instrument was tested by measurement of Cronbach's alpha. Cronbach's alpha is a measure of internal consistency for a reflective scale (Cronbach, 1951). All of the scales in this model are reflective. Another measure of reliability is composite reliability. Composite reliability (rho_c) is a measure of internal consistency for a scale that takes into account the number of indicators in the scale and the average variance extracted (Bagozzi & Yi, 1988; Nunnally & Bernstein, 1994).

Validity analysis shows if the items of a corresponding construct adequately correlate (convergent validity) with each other and how they discriminate (discriminant validity) the corresponding factor from other factors (D. Straub et al., 2004). It is measured by the Average Variance Extracted, item cross-loading and the Fornell- Larcker Criterion (Fornell, 1981).

Average Variance Extracted (AVE) is a measure of how much variance in the indicators is explained by the latent variables. The Fornell-Larcker criterion, which is the square root of AVE, is a method of assessing discriminant validity (Pedhazur & Schmelkin, 2013). Item cross-loadings test the loading of items on corresponding and other constructs and are also indicative of convergent and discriminant validity (Urbach & Ahlemann, 2010).

Multicollinearity was tested by Bivariate Correlations and Variance Inflation Factors (VIF) and provided insights on whether multicollinearities between the variables were present (Meyers et al., 2016; Petter et al., 2007). Testing Criteria for the measurement model, including threshold values, are presented in Table 9.

Table 9. Testing Criteria for Measurement Model

Analysis	Test	Acceptance criterion
Reliability of Measurement Instruments	Cronbach's alpha	Value > 0.70 (Nunnally and Bernstein 1994)
	Composite reliability	Value> 0.60 (Bagozzi and Yi 1988)
Convergent and Discriminant Validity	Item cross-loading	The loading on a corresponding construct should be larger than loading on other constructs by at least 0.10 (Chin 2010; Gefen and Straub 2005)
	Fornell-Larcker Criterion	The square root of the Average Variance Extracted (AVE) of a construct must be larger than the correlation between that construct and any other construct in the model (Barclay et al. 1995)
Multicollinearity	Bivariate Correlations VIF	Bivariate correlations greater than 0.8 can indicate traces of multicollinearity (Meyers et al. 2006)
		Variance Inflation Factors (VIFs) greater than 3.3 may indicate potential multicollinearity issues (Petter et al. 2007)

5.4.2 Structural Model

The Structural Model was tested by calculating its coefficient of determination and effect size values. The coefficient of determination R^2 measures how much of the variance in the dependent variable is explained by the independent variables. Acceptable values of R^2 differ in the literature from a high conservative value of 0.67 to a moderate 0.33 and a low

weak value of 0.19 (Chin, 1998). The minimum threshold was proposed by (Falk & Miller, 1992) for an R^2 value of 0.1 that would provide a minimum explanation of the dependent variable by independent variables.

To evaluate the impact that the independent variable has on a dependent variable, a test for f^2 was used. Effect sizes are small, medium and large. Small effect sizes fall in the range of f^2 <0.02 (Roldán & Sánchez-Franco, 2012). When 0.02< f^2> 0.15, the effect size is considered medium. When the effect size is > 0.35, the effect is defined as large and indicates that the independent construct has a high impact on the endogenous variable (Cohen, 1988). Testing criteria for the structural model are shown in Table 10.

Table 10. Testing Criteria for Structural Model

Test	Source	Acceptance criterion
Path Coefficients Significance	Obtained from SmartPLS	Bootstrap approach was employed to evaluate the significance of path coefficients (Chin 1998)
R^2 for endogenous Variables	Obtained from SmartPLS	Although no specific acceptable threshold value has been set for R^2, a large enough R^2 values to achieve. Adequate explanatory power is sought-after (Gefen et al. 2000; Urbach and Ahlemann 2010)
Effect Sizes	Obtained from SmartPLS	The magnitude of the effect sizes of each path was evaluated following these values: 1. For small effect size, 0.02 < f2 ≤ 0.15 2. For medium effect size, 0.15 <f2 ≤ 0.35 3. For large effect size f2 > 0.35 (Chin, 1998; Cohen, 1988).
Goodness of **Fit** (GoF) index	$GoF = \sqrt{\frac{\sum_n AVE_n}{n} \times \frac{\sum_m R_m^2}{m}}$ *Obtained from SmartPLS*	Absolute GoF can be used to assess the PLS model in terms of overall (both measurement and structural levels) prediction performance The suggested baseline values of GoFsmall (.10), GoFmedium(.25), and GoF1arge (.36) were used to evaluate fit of the model (Tenenhaus et al. 2005; Wetzels et al. 2009)

5.5 Chapter Summary

In Chapter 5, the general research methodology that was utilized in this study, including Research design, Measurement Instrument, Outlier Analysis and Data Screening, and Model Validation and Evaluation were discussed.

This explained how the experimental part of the study was done. The results of the study are presented in the following Chapter 6.

6. Results and Data Analysis

The results section presents a quantitative data analysis of the pilot study, quantitative data analysis of the full study and an explanatory qualitative analysis of the full study data.

The pilot study was performed with 72 participant responses. The full study, which included the pilot, collected a total of 323 responses.

6.1 Pilot Study

After the participant responses were extracted from the Zoho platform, all the records were coded and analyzed. The responses were analyzed for the presence of inconsistencies in data, missing data, out of range values and participant response speed. There were no missing data in the survey, but I noticed that several respondents answered "I don't know" to a number of survey questions. The decision was that those responses were marked and imported into Smart PLS 4 as missing values. Subsequently data were analysed for the presence of univariate and multivariate outliers using Inter Quartile Range (IQR) and Mahalanobis distance analyses. Following screening of the pilot study data, items #16 and #51were removed as outliers.

Following data screening and removal of outliers a preliminary analysis in SMART PLS 4 was carried out. The preliminary data analysis revealed that item #3 of the Functional Area Experience construct wasn't loading on the variable properly, as its loading was lower than cross loading on other variables. This item could not be indicative of the underlying construct, so it (item #3 of the Functional Area Experience construct) was removed from

the data pool. The final data set was adjusted and imported to the SMART PLS 4 for quantitative data analysis.

Analysis of pilot study data showed acceptable construct reliability and validity results, and significant relationships between the constructs besides one path. Familiarity with Others and Performance Expectancy showed non-significant relationships.

The Pilot Study showed that the survey questions sufficiently satisfied the study intention and requirements. There were no changes needed to be made to the survey for the full data set collection.

The data collection process continued with the collection of the remainder of the participants' responses, with no adjustments needed. Once the remainder of the data were collected, it was combined into one file. Pilot data, as well as the final run of data were combined together for the full study data analysis.

6.2 Full Study

The full data analysis started with the sample of 332 participants. Analysis for the presence of inconsistencies in data, missing data, out of range values and participants' response speed is explained in detail in subsection 6.2.1. Analysis for the presence of univariate and multivariate outliers and final data refinement procedure were performed as described in subsection 6.2.2.

After all the unacceptable records of participant responses were removed, a full quantitative analysis of the full study data set was carried out, first with a presentation of demographics (subsection 6.2.3), and then presentation of the results of reliability and validity analysis

results (subsections 6.2.4 and 6.2.5), and multicollinearity analysis and common method bias (subsection 6.2.6 and 6.2.7). Analysis of the measurement model was followed by an analysis of the structural model for R^2 and effect sizes (subsection 6.2.8). The Results section of the quantitative analysis is concluded by the presentation of hypotheses testing and control variables analysis in subsections 6.2.9 and 6.2.10.

The last subsection 6.3 provides an explanatory discussion of participants' feedback. The Results chapter concludes with the chapter summary.

6.2.1 Data Screening

After the participants' responses were extracted from the Zoho platform, all the records were coded and analyzed. There were no missing values in the full study data set. It was noticed, though, that several respondents exhibited a lack of interest in the survey and responded "I don't know" to every survey question (responses #66, #225, #236, #286 and #287). Those five responses were deemed to be unsuitable and were removed from the data set.

As in the pilot study, there were a small number of "I don't know" responses from other participants as well. These responses were treated as missing values and replaced with a notional value of (-99) to identify them as missing values when imported into Smart PLS 4.

6.2.2 Outlier Analysis

The process for outlier analysis was described earlier in subsection 5.3. Interquartile range analysis applied the 1.5 IQR rule and identified the variables with out-of-range values. The

analysis showed that, although there were a small number of out-of-range responses in several variables, four particular response records contained out of range values in more than 75% of the variables. This showed that those four participants (#128. #195 and #316) were not particularly diligent in their responses, placing the extreme response choices on more than 75% of the survey questions. Those responses were removed from the data set. Besides those four univariate outliers, another two responses (#197) showed out-of-range values on more than 50% of the variables. In addition, these participants also spent an extremely small amount of time to complete the survey questions (less than a minute). These responses were also deemed outliers and removed from the final dataset.

A few outliers (less than 1% of total items) were left in the preliminary dataset. The decision on these was made based on the fundamental questions – "Does this outlier represent my sample?" (Meyers et al., 2016). All these respondents spent sufficient time on their responses. The participant pool was diverse and perhaps certain business processes and the participants' EIS implementation process involvement could be attributed to those values.

Multivariate outlier detection was carried out through Mahalanobis distance analysis with IBM SPSS. The Mahalanobis distance was calculated and compared with the chi-square distribution. Although several responses were very close to the set threshold of 0.001, there were no cases above the threshold p value. Therefore, all the remaining responses were kept.

After removal of a total of 11 outliers in the full data set through the outlier analysis process, the remaining data set had 321acceptable data points which were imported into Smart PLS 4 for the PLS SEM data analysis.

6.2.3 Demographics

The demographic aspect of the survey initially had nine questions. When the survey was uploaded to Zoho, additional screening questions were added to ensure that only participants with sufficient expertise could participate in the survey. All recruited participants were from the USA. Zoho also ensured that only full time or part time employees participated in the survey. An additional question on User Support was added to ensure that the participants had been involved in interactions involving Super User support. Another question queried the participants on various system types. Those three questions also provided interesting insights into the study, so they were included in the demographic variables analysis. The following description provides an insight on demographics of the research participants' sample.

- ***Employment Status***

As mentioned above, only full time and part time employees participated in the survey. 88.5% of the 321 participants were employed full-time and 11.45% were employed part-time (Appendix A).

- ***User Support***

A definition of Super User was added to provide the exact description of user support that is used in this study. However, two other options of Key User and Power User were

suggested as well in order to capture various definitions of Super User in participants' responses and experiences. As presented in Chapter 2, current literature accepts at least three variations of Super User definition: Super User, Key User and Power User (Mahdavian & Mostajeran, 2013; Obwegeser et al., 2019). Demographics showed that 29.82% of the study participants were using "Super User", 34.34% were using "Key User" and 35.84% used "Power User" definitions (Appendix A).

- ***Implemented EIS***

Another interesting insight concerned which implemented EIS the participants were familiar with. This showed that the participants were coming from diverse backgrounds and their experience with different EIS types also varied. Most of the participants had backgrounds in CRM, HRM or EHR implementations (Appendix A).

- ***Age***

The participant age range was relatively young: 0.6% less than 20 years old, 10.84% between 20 and 29 years old, 53.01% between 30 and 39 years old, 22.89% between 40 and 49 years of age, 8.73% between 50 and 60 years old. 3.92% over 60 years old (Appendix A).

- ***Gender***

From a gender perspective, 63.25% were men, 36.45 women and 0.3% identified themselves as non-binary participants (Appendix A).

- ***Industry***

Participants represented a wide range of industries, with the majority employed in construction (16.87%), manufacturing (13.86%) and finance (13.25%). Telecommunication and service were represented by 9.64% each. 9.34% worked in the health industry, 6.02% in the food industry and 21.39% of the participants indicated that small percentages worked in industries other than those indicated in the survey (Appendix A).

- ***Organizational Size***

Organizational size was another factor that could have a significance in variable relationships. More than half (53.61%) worked in large organizations with more than 250 employees. 34.34% in mid size organizations with 50 to 250 employees and 12.05% were employed in small organizations with less than 50 employees (Appendix A).

- ***Business Process***

36.75% of the participants came from Information Technology backgrounds, 11.14% from finance. 10.84% from each of Operations and Administration. 5.42% from Sales, and 3.31% from Marketing and Procurement each. 18.37% indicated that the business processes that they were involved in were other than indicated in the survey (Appendix A).

- ***Position***

Three position levels were offered by the survey to select. 65.96% indicated that they were in management roles, 21.99% indicated that they had non-management positions and

12.05% indicated that they were associated with project management functions (Appendix A).

- ***Years of Functional Area Experience***

Participants with 5 to 10 years experience in a functional area comprised 42.47% of the sample. 22.89% indicated that their functional area experience was between 1 and 5 years. 21.08% had 10 to 20 years of expertise. 9.94% had more than 20 years of experience in a functional area and 3.61% had functional area experience of less than a year (Appendix A).

- ***Degree of Involvement***

Another interesting factor was whether these users were actually partially involved with an implementation team and participated in EIS training, planning and execution phases. 25% said they were involved with an implementation team through training, 21.69% said that they were involved in some way in project execution. 19.28% mentioned that they were involved in some way in planning and execution. 21.99% said that they were also part of the project implementation team and 12.05% indicated that they did not participate in any way in any project implementation activities (Appendix A).

- ***Prior Experience as a Super User***

There would be instances that the users were involved in other EIS implementations at any given point of their working careers. This survey question showed that 66.27% of the participants were previously involved in other EIS implementations as Super Users, Key

Users or Power Users. 33.13% said that they had never been involved in any such role and 0.6% preferred not to answer this question (Appendix A).

Demographic data were used for the demographic variable analysis which is presented in the subsequent section. Demographic data details are illustrated by pie charts and attached in Appendix A.

6.2.4 Reliability Analysis

Since the variables used in the model are all reflective, their reliabilities were all tested by Cronbach's alpha. Cronbach's alpha is a measure of internal consistency for a scale. A value of Cronbach's alpha that is greater than or equal to 0.7 is generally considered to have acceptable reliability (Nunnally & Bernstein, 1994). Cronbach's alpha is calculated automatically by SmartPLS 4. All factors showed acceptable reliabilities with Cronbach's alpha values of > 0.7 (Kline, 2013). Composite reliability (rho_c) is a measure of internal consistency for a scale that takes into account the number of indicators in the scale and the average variance extracted, and rho_a is a measure of the dependability of the composite scale. A value of rho_a and rho_c > 0.6 is generally considered to be a good reliability. Composite reliability of variable constructs rho_a and rho_c are both > 0.6 (Bagozzi & Yi, 1988).

Table 11 presents the reliability statistics. The reliability values are above the acceptable thresholds, indicating that these results do not contain measurement errors and are within acceptable limits.

Table 11. Reliability Statistics

Factor	Internal Consistency Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Functional Area Expertise	0.756	0.757	0.891	0.804
Confirmation	0.703	0.702	0.834	0.627
Familiarity with others	0.772	0.781	0.867	0.686
Facilitating Conditions	0.806	0.806	0.885	0.720
Immediacy	0.749	0.751	0.856	0.666
Performance Expectancy	0.807	0.809	0.886	0.721
Perceived Facilitating Conditions	0.804	0.806	0.885	0.719
Perceived Performance	0.771	0.771	0.868	0.686
Resource Facilitating Conditions	0.77	0.82	0.861	0.674
Social Presence	0.774	0.781	0.869	0.688
EIS Technology Experience	0.833	0.835	0.9	0.749
User Satisfaction	0.773	0.778	0.868	0.687

6.2.5 Validity Analysis

Average Variance Extracted (AVE) is a measure of how much variance in the indicators is explained by the latent variables. AVE assesses convergent validity. A value of AVE > 0.50 is generally considered to be a good validity level. Table 11 shows that AVE for all factors is > 0.5.

Table 12. Validity Statistics - AVE

Factor	Average variance extracted (AVE)
Functional Area Expertise	0.804
Confirmation	0.627
Familiarity with others	0.686
Facilitating Conditions	0.720
Immediacy	0.666
Performance Expectancy	0.721
Perceived Facilitating Conditions	0.719
Perceived Performance	0.686
Resource Facilitating Conditions	0.674
Social Presence	0.688
EIS Technology Experience	0.749
User Satisfaction	0.687

The Fornell-Larcker criterion, which is the square root of AVE, is a method of assessing discriminant validity. It is based on the idea that the square root of the average variance extracted (AVE) for a latent variable should be greater than the correlations between the latent variable and all other variables (Barclay et al., 1995). The Fornell-Larcker criteria for the study factors are presented in Table 13.

Table 13. Validity Statistics - Fornell-Larcker criterion

Construct	Functional Area Expertise	Confirmation	Familiarity with others	Facilitating Conditions	Immediacy	Performance Expectancy	Perceived Facilitating Conditions	Perceived Performance	Resource Facilitating Conditions	Social Presence	Technical EIS Expertise	User Satisfaction
Functional Area Expertise	**0.897**											
Confirmation	0.478	**0.792**										
Familiarity with others	0.617	0.524	**0.828**									
Facilitating Conditions	0.495	0.678	0.513	**0.849**								
Immediacy	0.41	0.675	0.468	0.754	**0.816**							
Performance Expectancy	0.494	0.675	0.476	0.804	0.719	**0.849**						
Perceived Facilitating Conditions	0.427	0.741	0.457	0.658	0.649	0.658	**0.848**					
Perceived Performance	0.438	0.658	0.463	0.592	0.588	0.578	0.72	**0.828**				
Resource Facilitating Conditions	0.439	0.453	0.495	0.449	0.458	0.405	0.399	0.388	**0.821**			
Social Presence	0.504	0.659	0.592	0.778	0.751	0.695	0.568	0.561	0.563	**0.83**		
Integrative Technology Experience	0.272	0.344	0.398	0.423	0.387	0.406	0.352	0.32	0.579	0.464	**0.866**	
User Satisfaction	0.505	0.751	0.531	0.693	0.672	0.687	0.77	0.692	0.395	0.629	0.319	**0.829**

The results show that square roots of the average variance extracted for each variable are greater than the correlations between the latent variable and all other variables.

Item cross-loading tests the loading of items on the corresponding and other constructs (Urbach & Ahlemann, 2010). Loading on a corresponding construct should be larger than loading on other constructs by at least 0.10 (Chin, 2009; Gefen & Straub, 2005; Vinzi et al., 2010). The item loading and cross-loading results are shown in Table 14. The loadings of the constructs are larger than cross-loadings by more than 0.1, indicating that there is an adequate level of construct validity in the model.

Table 14. Validity Statistics - Item Loadings and Cross-loadings

Construct	Item	Functional Area Expertise	Confirmation	Familiarity with others	Facilitating Conditions	Immediacy	Performance Expectancy	Perceived Facilitating Conditions	Perceived Performance	Resource Facilitating Conditions	Social Presence	Technical EIS Expertise	User Satisfaction
Functional Area Expertise	areaexp_1	**0.901**	0.466	0.554	0.476	0.404	0.453	0.445	0.425	0.425	0.468	0.280	0.485
	areaexp_2	**0.892**	0.389	0.554	0.411	0.329	0.432	0.318	0.360	0.361	0.435	0.207	0.420
Confirmation	conf_1	0.395	**0.803**	0.382	0.543	0.550	0.547	0.592	0.560	0.389	0.567	0.316	0.625
	conf_2	0.344	**0.809**	0.374	0.540	0.507	0.538	0.501	0.468	0.349	0.520	0.236	0.551
	conf_3	0.392	**0.763**	0.483	0.527	0.541	0.518	0.656	0.527	0.336	0.476	0.260	0.602
Familiarity with others	familiar_1	0.550	0.456	**0.863**	0.440	0.441	0.440	0.407	0.440	0.456	0.570	0.408	0.481
	familiar_2	0.506	0.445	**0.809**	0.438	0.355	0.368	0.380	0.332	0.410	0.462	0.289	0.395
	familiar_3	0.474	0.399	**0.812**	0.397	0.360	0.368	0.346	0.370	0.358	0.427	0.279	0.439
Facilitating Conditions	fc_1	0.483	0.545	0.459	**0.843**	0.641	0.682	0.507	0.467	0.393	0.658	0.369	0.551
	fc_2	0.378	0.607	0.406	**0.860**	0.623	0.675	0.574	0.497	0.347	0.671	0.318	0.602
	fc_3	0.402	0.574	0.443	**0.843**	0.656	0.690	0.591	0.541	0.405	0.651	0.390	0.611
Immediacy	im_1	0.306	0.556	0.388	0.554	**0.806**	0.604	0.527	0.438	0.380	0.603	0.321	0.555
	im_2	0.338	0.532	0.337	0.676	**0.839**	0.611	0.516	0.503	0.378	0.622	0.342	0.566
	im_3	0.362	0.566	0.426	0.615	**0.802**	0.542	0.548	0.501	0.363	0.613	0.283	0.523
Performance Expectancy	pe_1	0.468	0.645	0.465	0.670	0.632	**0.837**	0.567	0.511	0.363	0.618	0.351	0.644
	pe_2	0.389	0.541	0.353	0.708	0.615	**0.857**	0.548	0.472	0.334	0.577	0.337	0.552
	pe_3	0.393	0.523	0.386	0.669	0.581	**0.852**	0.560	0.487	0.332	0.570	0.346	0.543
Perceived Facilitating Conditions	pfc_1	0.412	0.608	0.401	0.562	0.560	0.585	**0.858**	0.692	0.362	0.482	0.333	0.663
	pfc_2	0.305	0.616	0.379	0.534	0.529	0.570	**0.815**	0.546	0.321	0.459	0.254	0.611
	pfc_3	0.369	0.657	0.384	0.576	0.562	0.523	**0.869**	0.595	0.332	0.502	0.309	0.682
Perceived Performance	pp_1	0.429	0.566	0.388	0.486	0.508	0.532	0.584	**0.817**	0.357	0.499	0.299	0.589
	pp_2	0.351	0.547	0.391	0.510	0.483	0.457	0.601	**0.830**	0.284	0.471	0.242	0.581
	pp_3	0.303	0.519	0.370	0.472	0.468	0.444	0.604	**0.838**	0.322	0.421	0.252	0.547
Resource Facilitating Conditions	resfc_1	0.412	0.379	0.374	0.340	0.388	0.329	0.313	0.304	**0.801**	0.422	0.514	0.308
	resfc_2	0.342	0.425	0.443	0.462	0.432	0.371	0.406	0.367	**0.855**	0.533	0.441	0.391
	resfc_3	0.334	0.270	0.394	0.238	0.260	0.273	0.204	0.252	**0.805**	0.394	0.499	0.227
Social Presence	sp_1	0.469	0.560	0.504	0.670	0.649	0.637	0.480	0.481	0.435	**0.858**	0.397	0.554
	sp_2	0.419	0.548	0.480	0.616	0.589	0.536	0.459	0.427	0.496	**0.792**	0.342	0.510
	sp_3	0.360	0.532	0.491	0.647	0.629	0.550	0.475	0.489	0.478	**0.837**	0.415	0.499
Integrative Technology Experience	techexp_1	0.210	0.276	0.316	0.389	0.362	0.375	0.315	0.261	0.395	0.389	**0.862**	0.285
	techexp_2	0.264	0.327	0.372	0.378	0.289	0.330	0.308	0.293	0.529	0.413	**0.885**	0.271
	techexp_3	0.237	0.292	0.348	0.330	0.351	0.346	0.289	0.278	0.589	0.405	**0.849**	0.272
User Satisfaction	us_1	0.491	0.681	0.428	0.588	0.613	0.595	0.741	0.658	0.332	0.554	0.310	**0.848**
	us_2	0.380	0.591	0.406	0.560	0.547	0.569	0.578	0.501	0.318	0.496	0.207	**0.821**
	us_3	0.376	0.588	0.490	0.575	0.504	0.541	0.580	0.552	0.333	0.511	0.271	**0.817**

6.2.6 Multicollinearity Analysis

VIF (Variance Inflation Factor) is a measure of multicollinearity. It is calculated by calculating the inverse of the squared multiple correlation coefficient for a variable. A VIF of 1 indicates no multicollinearity and VIF > 3.3 indicates potential presence of multicollinearity (Petter et al., 2007). The resulting values of VIF are all less than 3.3 which means that there are no multicollinearity issues in the data.

Table 15. VIF Results

Outer Model		*Inner Model*	
areaexp_1	1.585	areaexp -> pe	1.702
areaexp_2	1.585	conf -> us	1.000
conf_1	1.429	familiar -> pe	2.007
conf_2	1.523	fc -> conf	3.131
conf_3	1.269	im -> pe	2.310
familiar_1	1.664	pe -> conf	3.100
familiar_2	1.541	pfc -> conf	2.622
familiar_3	1.555	pp -> conf	2.199
fc_1	1.744	resfc -> fc	1.000
fc_2	1.824	sp -> pe	2.939
fc_3	1.685	techexp -> pe	1.320
im_1	1.423		
im_2	1.585		
im_3	1.519		
pe_1	1.565		
pe_2	1.92		
pe_3	1.911		
pfc_1	1.901		
pfc_2	1.55		
pfc_3	1.905		
pp_1	1.479		
pp_2	1.612		
pp_3	1.703		
resourcefc_1	1.672		
resourcefc_2	1.418		
resourcefc_3	1.873		
sp_1	1.666		
sp_2	1.472		
sp_3	1.693		
techexp_1	1.845		
techexp_2	2.259		
techexp_3	1.858		
us_1	1.587		
us_2	1.588		
us_3	1.576		

6.2.7 Common Method Bias Analysis

Common Method Bias (CMB) is one of the indicators of error and a potential threat to the validity of the research results. A CMB indicates that variance in self-report factors could possibly be attributable to the measurements method and not to the analyzed relationships between the variables (Podsakoff, 2003; D. Straub et al., 2004). Common method bias in Smart PLS is assessed through Variance Inflation Factor (VIF) values of the structural or inner model. If the VIF is greater than 3.3, that would indicate a pathological collinearity as well as that the model is affected by common method bias. In this study all the VIF values are lower than 3.3. This indicates that the model can be considered free from common method bias (Kock, 2015).

6.2.8 Analysis of Path Coefficients, R^2 and Effect Sizes

A Path Coefficient is a measure of the strength of the relationship between two latent variables. A path coefficient approaching 1 indicates a perfect relationship, while a non-significant path coefficient means no relationship between two latent variables.

To evaluate the path coefficients, the bootstrap approach was used. Bootstrapping was applied with 5,000 resamples in each case. All variable relationships were significant except the path Familiarity with Others -> Performance Expectancy.

Table 16. Path Coefficients

Path	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Functional Area Expertise -> Performance Expectancy	0.178	0.176	0.062	2.863	0.0040

Confirmation -> User Satisfaction	0.751	0.753	0.035	21.644	0.0000
Familiarity with others -> Performance Expectancy	-0.019	-0.014	0.063	0.307	0.7590
Facilitating Conditions -> Confirmation	0.183	0.187	0.088	2.085	0.0370
Immediacy -> Performance Expectancy	0.434	0.439	0.071	6.129	0.0000
Performance Expectancy -> Confirmation	0.179	0.18	0.082	2.194	0.0280
Perceived Facilitating Conditions -> Confirmation	0.376	0.37	0.081	4.637	0.0000
Perceived Performance -> Confirmation	0.175	0.177	0.063	2.777	0.0060
Resource Facilitating Conditions -> Facilitating Conditions	0.449	0.456	0.055	8.108	0.0000
Social Presence -> Performance Expectancy	0.254	0.249	0.092	2.768	0.0060
EIS Technology Experience -> Performance Expectancy	0.079	0.078	0.039	2.012	0.0440

The structural model was tested by calculating the coefficient of determination and effect size values. The coefficient of determination R^2 measures how much of the variance in a dependent variable is explained by the independent variables. Acceptable values of R^2 differ in practice, according to the literature, from a highly conservative value of 0.67 to a moderate value of 0.33 and a low weak value of 0.19 (Chin, 1998). The minimum threshold proposed by (Falk & Miller, 1992) is for R^2 of 0.1 to provide a minimum explanation of the dependent variable by independent variables.

To evaluate the impact that independent variables had on a dependent variable, a test for f^2 was used. Effect sizes are small, medium and large. An effect size is considered small when

f^2 is <0.02 (Roldán & Sánchez-Franco, 2012). When 0.02< f^2> 0.15, the effect size is considered medium. When the effect size is > 0.35, the effect is defined as large, indicating that the independent construct has a high impact on the endogenous variable (Cohen, 1988).

R^2 is a measure of the amount of variance in the dependent variable that is explained by the independent variables. Acceptable values of R^2 differ from high conservative values of 0.67 to a moderate 0.33 and a low weak value of 0.19 (Chin, 1998). As shown in Table 17, three of the model constructs (Confirmation, Performance Expectancy and User Satisfaction) have R^2 adjusted values of >0.33. which means that these variables were explained moderately well. However, the R^2 for Facilitating Conditions is 0.202. Although this construct is relatively weak (>0.19), it is still in an acceptable range of the R^2 value threshold.

f-square is a measure of the amount of variance in the dependent variable that is explained by the independent variables, taking into account the error variance. The effect sizes were calculated and showed that only the relation "Familiarity with others -> Performance Expectancy" was very small, below the threshold of 0.02 effect size, resulting in a decision of no effect. Other relations had small, medium and large effects, as shown by the f^2 values in Table 18.

Table 17. R^2 values

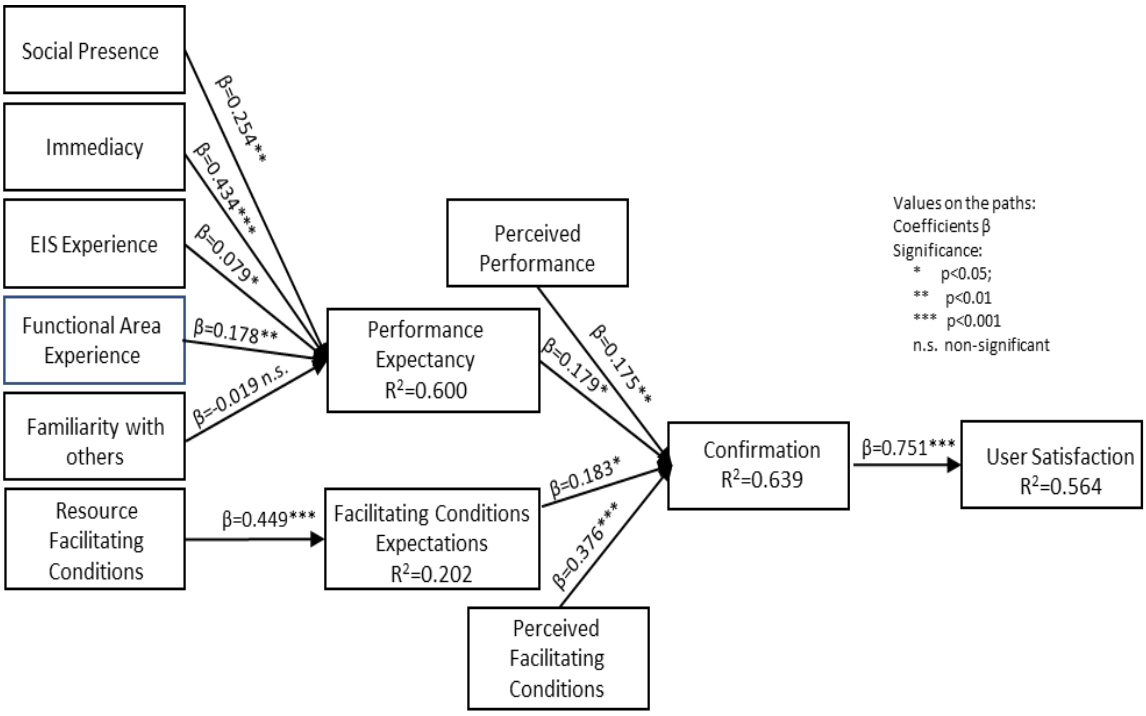
Construct	R^2	R^2 adjusted
Confirmation	0.639	0.634
Facilitating Conditions	0.202	0.199
Performance Expectancy	0.600	0.593
User Satisfaction	0.564	0.563

Table 18. f^2 Value Statistics

Relation	f^2	Effect Size
Functional Area Expertise -> Performance Expectancy	0.05	Small
Confirmation -> User Satisfaction	1.29	Large
Familiarity with others -> Performance Expectancy	0.00	No effect
Facilitating Conditions -> Confirmation	0.03	Small
Immediacy -> Performance Expectancy	0.25	Medium
Performance Expectancy -> Confirmation	0.03	Small
Perceived Facilitating Conditions -> Confirmation	0.15	Large
Perceived Performance -> Confirmation	0.04	Small
Resource Facilitating Conditions -> Facilitating Conditions	0.26	Large
Social Presence -> Performance Expectancy	0.06	Small
Integrative Technology Experience -> Performance Expectancy	0.02	Small

Research Model with statistical results is presented in Figure 7.

Figure 7. Research Model with Statistical Results



6.2.9 Hypotheses Testing Results

Hypotheses testing results are presented in Table 18. These revealed that all but one hypothesis was supported. Below is a brief explanation of each hypothesis result.

H1 - Super User-facilitated user sense of social presence will positively influence Performance Expectancy among EIS users.

H1 is supported with $\beta = 0.254$ and $p<0.01$. The results showed that a feeling of social presence that is commonly associated with social communities, platforms and collaborative technologies is valid for integrative technologies as well. The ability of Super Users to emphasize the collaborative features of integrative systems and encourage the user perceptions of an EIS as a social presence medium are reflected in the supported positive relationship between Social Presence and User Performance Expectancy.

H2 - Super User-facilitated user sense of Immediacy will positively influence Performance Expectancy among EIS users.

H2 is supported with $\beta = 0.434$ and $p<0.001$. Immediacy has a high level of significance which indicates that immediacy of user actions tends to significantly improve their performance expectancy. Immediacy in communication tends to support faster learning processes and problem solving which can be established by a Super User through changes in user perception, creating a higher performance environment.

H3 - User integrative technology experience will positively influence Super User-facilitated Performance Expectancy among EIS users.

H3 is supported with $\beta = 0.079$ and $p<0.044$. Although this is a weaker relationship with lower significance value, it is still significant and represents a supported relationship. The supported relationship indicates that previous integrative technology experience will positively influence user performance expectancy. Prior knowledge will allow the users to focus on improvements with EIS rather than learning from scratch, with better attention and understanding of Super User guidance and support and better opportunities to focus on extended perceptions of previously familiar technology.

Table 19. Hypotheses Test Results

	Model Hypotheses	Coefficient	Sample mean	Standard deviation	T statistics	P values	Outcome
H1	Super User-facilitated user sense of social presence will positively influence Performance Expectancy among EIS users	0.254	0.249	0.092	2.768	0.006	Supported
H2	Super User-facilitated user sense of Immediacy will positively influence Performance Expectancy among EIS users	0.434	0.439	0.071	6.129	0.000	Supported
H3	User integrative technology experience will positively influence Super User-facilitated Performance Expectancy among EIS users	0.079	0.078	0.039	2.012	0.044	Supported
H4	User functional area expertise will positively influence Super User-facilitated performance expectancy among EIS users	0.178	0.176	0.062	2.863	0.004	Supported
H5	User familiarity with others will positively influence Super User-facilitated performance expectancy among EIS users	-0.019	-0.014	0.063	0.307	0.759	Rejected
H6	Super User as a Resource Facilitating Condition will positively influence perception of Facilitating Conditions among EIS users	0.449	0.456	0.055	8.108	0.000	Supported
H7	User Performance Expectancy will positively influence user Confirmation of Performance Expectancy among EIS users	0.179	0.180	0.082	2.194	0.028	Supported
H8	User Expectations of Facilitating Conditions will positively influence Confirmation of Facilitating Condition Expectations among EIS users	0.183	0.187	0.088	2.085	0.037	Supported
H9	User Perceived Performance through Super User facilitation will positively influence Confirmation of Performance among EIS users	0.175	0.177	0.063	2.777	0.006	Supported
H10	User Perceived Facilitating Conditions through Super User facilitation will positively influence Confirmation of Facilitating Conditions among EIS users	0.376	0.370	0.081	4.637	0.000	Supported
H11	Confirmation associated with Super User facilitation will positively influence User Satisfaction among EIS users	0.751	0.753	0.035	21.644	0.000	Supported

H4 - User functional area expertise will positively influence Super User-facilitated performance expectancy among EIS users.

H4 is supported with $\beta = 0.178$ and $p<0.004$. Functional area expertise will have a significant influence on user performance expectancy. Adequate functional area expertise will help the user to focus on learning the technical side of new EIS. Super User facilitation of user EIS perception changes and users increasing their use of the new or revised EIS as a collaborative medium will allow for better collaboration and a more collaborative and effective team learning process.

H5 - User familiarity with others will positively influence Super User-facilitated performance expectancy among EIS users.

The H5 hypothesis yields a high p value ($p= 0.759$), thus the hypothesis is rejected. This indicates that performance expectancy stems mainly from Super User influence than from other team member influences.

H6 - Super User as a Resource Facilitating Condition will positively influence perception of Facilitating Conditions among EIS users.

H6 is supported with $\beta = 0.449$ and $p<0.0001$. The very low p value shows a high significance of this relationship. User perceptions of Super User as an organizational resource available for the employees creates a perception of readily available support as a part of organizational assets. Utilization of Super Users as a part of organizational assets creates positive user perception and satisfaction with organizational facilitating conditions.

H7 - User Performance Expectancy will positively influence user Confirmation of Performance Expectancy among EIS users.

H7 is supported with $\beta = 0.179$ and $p<0.028$. Performance Expectancy with Super User support positively influences Confirmation.

H8 - User Expectations of Facilitating Conditions will positively influence Confirmation of Facilitating Condition Expectations among EIS users.

H8 is supported with $\beta = 0.183$ and $p<0.037$, indicating the importance of facilitating conditions and its positive influence on Confirmation.

H9 - User Perceived Performance through Super User facilitation will positively influence Confirmation of Performance among EIS users.

H9 is supported with $\beta = 0.175$ and $p<0.006$, showing a positive relationship with Confirmation

H10 - User Perceived Facilitating Conditions through Super User facilitation will positively influence Confirmation of Facilitating Conditions among EIS users.

H10 is supported with $\beta = 0.376$ and $p<0.000$, a significant positive influence of Perceived Facilitating Conditions on Confirmation

H11 - Confirmation associated with Super User facilitation will positively influence User Satisfaction among EIS users.

H11 is supported with $\beta=0.751$ and $p<0.000$, a Confirmation of user expectations of Super User Support to positively influence User Satisfaction.

6.2.10 Control Variable Analysis

In the methodology chapter we discussed the demographic variables that were analyzed for a potential impact on the endogenous constructs. To analyze the potential effect of the control variables on endogenous constructs, each of the control variables was coded as a binary variable through introduction of dummy variables. Subsequently, they were added one by one into the model to investigate their effect on each endogenous variable. Overall results of control variable analysis are presented in **Appendix B**. Note that many of these impacts are negative. Control variables that had an impact on performance expectancy are: EHR systems, CRM systems, SCM systems, financial business process, other business processes, and "No involvement in the system implementation process" with a significance of $p<0.05$.

The facilitating conditions construct also showed potential control variable impact with: small organizational size, food industry, financial industry, marketing business process and position project management with significance $p<0.05$. Facilitating conditions also showed potential control variable impact with significance of $p<0.01$ for the control variables: large organization size, procurement business process, finance business process, other business processes, non-management position, project management team involvement, planning and execution phase involvement, no participation in EIS implementation phases and prior Super User experience.

The Confirmation factor showed potential impact from control variables for EAM systems and other EIS systems with significance of $p<0.05$.

User satisfaction also revealed the control variables that could potentially create an impact, including: CRM systems, gender, procurement business process with significance $p<0.05$, and Non management positions with significance $p<0.01$. This showed that females were more satisfied with Super User support during EIS implementations than men. All the remaining variables were non-significant.

Although most of the control variables showed small significance, the findings are still worthwhile considering for possible inclusion in future studies the control variables that we found with significance $p<0.01$, specifically for facilitating conditions and user expectations.

6.3 Explanatory Study – Thematic Analysis

At the end of the survey, all participants were asked three open-ended questions that invited them to share their experiences with Super Users from the last EIS implementation that they were involved in. Questions were related to user expectations, Super User support activities and user satisfaction/dissatisfaction. A table with the exact wording of open-ended questions was introduced in the Methodology section (Table 7).

Responses from participants provided information on user expectations such as Super User activities and user satisfaction, that was beyond what we had found in the quantitative part of this study and beyond the research focus. However, the analysis of the participant feedback provided not only better explanations for the research results, but also gave additional information that contributes to the quantitative research and provides avenues and directions for future studies.

All responses were analyzed in NVivo and different themes were identified that related to performance and facilitating conditions. The first group that represented Super User-related performance identified several subthemes related to Collaboration, Training and Support. Those subthemes were also further categorized to Collaborative Teamwork, Collaborative Communication, Training Efficiency, Training Depth, Emotional Support, Proactive Support, Continuous Support and Extra Support. The second group that represented the Super User- related facilitating conditions also had three subthemes: Recruitment/Selection, Development/Fit and Readiness/Preparedness.

Results of the analysis showed that many responses identified collaborative teamwork during and after the implementation as one of the major sources of satisfaction with the Super User-supported EIS implementation process. Recruitment/Selection of the Super User as a resource facilitating condition, on the other hand, was identified as a source of satisfaction, but also dissatisfaction with the implementation process. In general, the process of recruitment/selection, development/fit and readiness/preparedness of the Super User as a resource facilitating condition was identified as an important factor to examine in order to understand the sources of user dissatisfaction in detail.

The results of thematic analysis of Super User- related performance are presented in Table 20. Results of thematic analysis of Super User-related facilitating conditions are presented in Table 21. All themes are supported by samples of user quotations following the respective tables.

6.3.1 Super User related Performance

Table 20. Super User related Performance Themes

SU related performance		User Expectations	SU support Activities	Satisfaction factors
Collaboration	**Teamwork**	"effectively within the team"	"training other users.. sharing best practices" "work better as a team" "train the trainer"	"comraderie of all users" "Togetherness" "collaborate with my coworkers..ease unfamiliarity" "collaborate more effectively"
	Communication	"Clear communication" "Communication is a key"	"open dialogue" "clear, easy to understand" "start a chat and how quickly it works"	"Much more streamlined communication"
Training	**Efficiency**	"Tips and tricks" "Completing tasks quicker" "More efficient at my work"	"use the features more efficiently" "Quizzes on the new system"	"Ease and accuracy" "quality of training" "use the system to non-technical users"
	Depth	"In-depth training"	"certain terminology.. show the way" "in and outs"	"hands on opportunity"
Support	**Emotional**	"Positive regard and support, facilitate voice, autonomy, independence" "Worried about technical background" "worried about implementation"	"Encouraging other workers" "not be overwhelmed"	"willingness they had to answer questions"
	Proactive	"be able to answer questions, show examples"	"focus also was on a plan to lessen errors"	"knew exactly what to do..was there to help"
	Continues	"Ongoing support"	"understood what had been accomplished"	"Ongoing support"
	Extra	Support with functions	"came and checked on each of us"	"holds your hand and walks you through"

<u>Expectations</u>

Collaboration

133 “Just be helpful when needed and keep it simple and easy to understand. Communication is key. Realize that not everyone knows their slang term for things and explain it the right way.”

#276 “Communications, ethical thinking and adaptation to new [environment]…”

#295 “My expectations were that the Super user would not be able to "bounce" effectively within my team. Also, I was concerned about "hiccups" with any upgraded system, but the Super User helped us navigate the hiccups or change.”

Training

170 Better use of system and help with being more efficient at my work. Completing my tasks much quicker

#13 "I expected that the super user would have tips and tricks of the system to help expedite processes or shortcuts."

#54 "In-depth training, ongoing support, explaining big picture and how things relate. Training on steroids"

Support

#226 "I was worried about the implementation and the support, and they delivered it effectively."

#168 "Express positive regard and support, Facilitate [user] voice, autonomy and independence."

#255 "To provide support with functions I could not perform or to train me in new functions."

#87 "I Expected the super user to be able to answer questions, show examples, etc…I expected them to be able to walk me through step by step."

Activities

Collaboration

#44 "..help participating in training other users, teaching them how to use the system and sharing best practices with fellow users"

#229 "Learning how to start a chat and how quickly it works. I enjoyed listening and learning how to use the features more efficiently so I can save time."

#141 "Open dialogue during training as things came up that were not thought about or making suggestions about changing things to make it flow better and be more efficient."

#183 "Just the willing ways they helped with the new system has helped us work better as a team. Everyone is learning more daily."

Training

#14 "I can recall the super user teaching certain terminology. I can also recall the super user taking the mouse to hover over certain parts of the training to show the way it worked."

#13 “The super user was well versed in the system and was able to answer all questions without looking at notes or getting guidance. We were shown shortcuts, like key commands to better and more quickly move in the system.”

#229 I enjoyed listening and learning how to use the features more efficiently so I can save time.”

Support

#40 “As the new system was implemented that superuser still came and checked on each of us to make sure that we were not having issues with the new system.”

#153 “Encouraging other workers in the EIS implementation. Because I think that’s what they needed”

#331 “The way questions were answered during the course of the process. It was made sure that we understood what had been accomplished so far before proceeding further.”

Satisfaction

Collaboration

135 “Other factors that contributed to the satisfaction with super user is the camaraderie of all users which has allowed our company to work at an optimum level.”

#153 “Togetherness contributed to the EIS upgrade success. That made me to be more interested in the EIS.”

#328 “I was able to collaborate with my coworkers who were not Super Users. This helped ease some of the unfamiliarity regarding the new system.”

#177 “Much more streamlined communication between departments. The more we went through with implementation of the system the more productive we have become.”

#229 “You can collaborate more effectively and also stay on top of the most important tasks.”

Training

290 “Ease and accuracy. Gave me confidence, made my job easier; help me gave self confidence; help me relate with co-workers.”

#288 “Very satisfied with the overall training and hands on opportunity to use the system”

#58 “they were better able to explain how to use the system to non-technical users than a systems/technical person would be able to do.”

Support

#226 “The willingness they had to answer our questions and help us out when we hit a wall made it easy to cope.”

#10 “She knew exactly what to do and where I would get stuck in the training and was there to help me through. Seemed to make the process super easy and seamless. Super user holds your hand and walks you through step by step.”

#58 “…they knew both how to use the system and they knew the functional area that it was designed for.”

6.3.2 Super User Related Facilitating Conditions

Table 21. Super User Related Facilitating Condition Themes

SU related Facilitating Conditions		User Expectations	SU support Activities	Satisfaction factors	Dissatisfaction factors
Recruitment	**Selection**	"Technical expertise" "Deep understanding" "Able to demonstrate" "Understand organizational workflows" "Expert knowledge of the process"	"Answer users' questions" "filter users' requests and concerns" "Someone who could assist" "making the system seem user friendly"	"knowledgeable and helpful..worked with them before" "I felt very comfortable with asking questions" "Personality of super user" "level of expertise knowledge, and familiarity" "knew how to use the system and they knew the functional area" "very patient"	"somebody who was forced into the position" "minimal effort was taken"
Development	**Fit**	"Best utilize data" "Well-versed" "Explaining big picture" "How things relate" "encouragement and guide learning" "professional, reliable, available, knowledgeable, experienced in activities"	1:1 instructions Group instructions "able to answer all questions" "well versed" "gave demonstrations"	"took time to teach and explain" "Advocating for users' needs and concerns" "Great at showing system… pretty smooth transition"	"could have been better at explaining the system" "they just didn't care"
Readines	**Preparedness**	"Sensitive environment" "Provide quiet area" "Smooth transition" "Minimal disruption" "preparation and pre-work" "Have all the answers"	"questions addressed quickly, recorded training sessions" "Manual to reference" "printouts to refer to and some online links to go"	"timing and flexibility of training classes" "get all my questions answered" "someone on hand and in person to help" "knowledgeable, helpful and available"	"Super User did not have most of the answers" "none was prepared"

Expectations

Recruitment/Selection

#298 "Expert knowledge of the process in order too give the best help to people they are training as possible."

#44 "It is necessary to have considerable technical expertise and a deep understanding of the system, being familiar with all aspects of the system, and being able to demonstrate one's professional knowledge and skills."

#168 "…they'll understand both organizational workflows and the rationale behind them."

Development/Fit

313 "…How to best utilize reports and data."

#40 "I expect the super users to be well-versed and be able to explain any issues that would come from the new system implementation."

#251 "They need to be professional, reliable, available, knowledgeable, experienced in activities."

Readiness/Preparedness

#168 "Provide a sensitive environment, provide encouragement and guide learning, provide a quiet area."

#22 "I expect … training, testing, a smooth transition, and minimal disruption."

#283 "I believe it is the preparation and pre-work related to learning a new EIS..."

Activities

Recruitment/Selection

#224 "Answer users' questions and filter users' requests and concerns back to the implementation partner."

#283 "Having a Super User assisting makes implementation so much easier. Users would know there is someone who could assist them during this transition."

#271 "Showing the capabilities of the system. Each function was described and sampled making the system somewhat seem user friendly."

Development/Fit

#11 “We had a lot of 1:1 instruction as well as group instruction meeting to help us learn all in the in and outs of the new system.”

#295 “We had a team chat that made it much easier to see each others’ questions as well as quickly get our own questions answered without needed a physical person to be bouncing (literally) from desk to desk. The Super User set realistic expectations about what could be answered /changed and what could not be changed/customized. Also, what changes were still in place after upgrade.”

#298 “they gave demonstrations of certain aspects of the training process which helps visual learners.”

Readiness/Preparedness

#13 “The super user was well versed in the system and was able to answer all questions without looking at notes or getting guidance.”

#40 “The super user was able to walk us each through the new system and what to expect. Also, the super user was able to give us a manual to reference which was very useful.”

#87 “we had printouts to refer to and some online links to go to.”

#54 “Questions addressed quickly, in person dedicated training time, recorded training sessions to refer back to.”

Satisfaction

Recruitment/Selection

#7 “The super user was knowledgeable and helpful and super user was always available when needed for questions. The super user was knowledgeable, and I worked with them before on other similar projects which made it comfortable.”

#19 “any time I had a question the super user was available to help. I knew the super user before implementing the product, so I felt very comfortable with asking the super user when I had questions.”

#235 “I knew the super user before hand due to them being a co-worker, so I was very comfortable. They were very patient with me and the process I also could see that the super user was trained very well before hand. So that made me comfortable in learning more from them.”

#56 “The level of expertise, knowledge, and familiarity that Super Users have with the EIS system.”

Development/Fit

#11 "The super user was fantastic with us and took time to teach and explain everything, so we understood what we were doing and why."

103 "Advocating for users' needs and concerns to the implementation team can lead to …. overall satisfaction."

#183 "Great at showing system, it was a pretty smooth transition and have help thing move smooth."

Readiness/Preparedness

#232 "I was able to get all my questions answered. the Super User was able to answer all of my questions during the implementation process and the time of transition."

#54 "Personality of super user, timing and flexibility of training classes, quality of training, ongoing support"

#87 "it was helpful to have someone on hand and in person to help and answer questions."

#19 "The super user was knowledgeable, helpful and available when I needed them all we had to do was ask for them to help."

Dissatisfaction

Recruitment/Selection

#328 "The so-called Super User was somebody who was forced into the position. As a result, minimal effort was taken on her part to become familiar with the new system."

Development/Fit

#65 "They could have been better at explaining the system and showing the staff how to use it in a better environment. None was prepared… it seemed as if the so-called super users were not that at all or that they just didn't care."

Readiness/Preparedness

#328 "I expected the Super User to have most of the answers regarding how to use the updated product. This did not end up being the case."

6.4 Chapter Summary

In Chapter 6, the analysis results were presented. First, the data screening process and outlier analysis results were explained. Then the model was analyzed for reliability, validity and multicollinearity of measurements. The measurement model results were followed by the analysis of structural model results with R^2 and f^2 values. All model reliability and validity results were within the limits suggested by literature.

Subsequently the hypotheses and control variables analysis were performed and results presented. 10 hypotheses were supported and one rejected. The research results showed that familiarity with others is not a factor that influence the performance expectancy.

The chapter concludes with thematic data analysis of the qualitative data, including results and explanations of participant feedback. Thematic data analysis revealed three major discoveries: first, the importance of collaboration, teamwork and communication in user satisfaction with the Super User facilitated implementation process. Second, a need for user development and user expectations of Super User role management. Third, dissatisfaction with organizational Super User selection and development processes as facilitation condition resources.

7. Discussion

This Chapter elaborates on all aspects of this research. It starts with a discussion of the main research results, followed by presentations on the results gathered from the demographics and the explanatory qualitative study. The chapter concludes with remarks on the contribution of this work to theory and practice, limitations, future studies and conclusions.

7.1 Research Results

High rates of EIS implementation failures and user dissatisfaction are partially attributed to the effectiveness of organizational support that is provided to users through Super User facilitation. This research has shown that Super User ability to emphasize the collaborative features of integrative systems through augmented perceptions by users of an EIS as a social presence medium can contribute to higher level of user performance and satisfaction.

Results of the statistical study show that ten of the eleven proposed hypotheses were supported and that Super User ability to emphasize the collaborative features of EIS proved to be an important factor for user satisfaction.

7.1.1 An Augmented View of Integrative Technologies

EIS technologies have been historically viewed as purely integrative. The purpose of integrative technologies was to consolidate corporate information in one system capable of processing, storing, sharing and analyzing the corporate body of data. The role of a Super User in this case was simplified to training users on the system's technical capabilities during system implementation.

Super User selection and training to support users' needs was discussed by (Obwegeser et al., 2019). The developed model (Obwegeser et al., 2019*)*, that was based on Katz's widely accepted skill measurement model combined with findings from an ERP implementation program at Vestas, clearly outline the process of Super User selection and training.

But the corporate user training and Super User selection and training processes are not a simple endeavour to undertake. It is limited in terms of time and resources. There are a limited number of Super Users available to be assigned to many users that need help and guidance in any given minute, and a handholding option is not always feasible. The ability of a Super User to support and emphasize to users the collaborative features of integrative systems can lead to a considerable gain in performance and user satisfaction. Below we will discuss the study results in relation to EIS collaborative features and Super User effectiveness.

Social Presence

The term "social presence" was introduced by (Short, 1976) in relation to telecommunications. It was defined as a quality of the collaboration medium and it was claimed that user feelings of social presence supported by collaborative technologies was positively related to their performance expectancy. Although regarded as being supportive of their collaborative features, integrative technologies up until that time were not utilizing the benefits that collaborative technologies offer, although the feeling of social presence that integrative technologies actually offer can lead to better user performance. The role of

Super Users in this regard is to provide support to users in a way that they will discover the augmented characteristics of EIS and utilize them to better their individual performance.

Super User support is intended to help users to discover a warmer, more personal and more sociable collaborative environment while using integrative systems. Such a user feeling while using an integrative system would contribute to a user feeling of social presence and thereby improve user performance through more effective and efficient collaboration.

My research with actual users has supported this hypothesis, showing that Super Users support a feeling of social presence that positively influences Super User-related Performance Expectancy. Users pointed out that with Super User Support, new EIS systems were able to help users to form a sense and feeling of social presence and create a warmer, more personal and more sociable collaborative environment, resulting in higher performance expectancy.

Immediacy

Immediacy refers to user ability to collaborate quickly with their partners, and to receive and provide responses more quickly. Integrative technologies provide the collaborative features for such user communication and collaboration. However, the collaborative features of integrative technologies are not yet fully explored. Thus, the benefits of collaboration could be lost if the user is not aware of them. One of these benefits is immediacy of collaboration. That is, the faster a user can provide or receive responses, the faster the possible issues could be resolved, leading to better efficiency and performance.

Super User support provides this training to users, thereby bridging the gap between integrative and collaborative features.

Immediacy in collaboration is especially important during integrative systems implementation. This will lead to faster communication, quicker troubleshooting and a more effective and efficient learning process. As a result, understanding of a new system, error troubleshooting, problem solving and consensus building can be done much faster and more efficiently.

Our research results supported this hypothesis. A Super User-facilitated process of user discovery of immediacy in collaboration on EIS platforms leads to greater performance expectancy.

Integrative Technology Experience

Technology experience and Functional area expertise are individual characteristics of experienced collaborative technology users. It is claimed (Brown et al., 2010) that users with the ability to use a specific type of technology (J. R. ; Z. Carlson Robert W., 1999; R. L. Daft & Lengel, 1986) as well as having prior functional area expertise (Short, 1976) can play a role in the use of this technology and user perceptions of it. Prior technology and computer systems experience (D. Compeau et al., 1999; D. H. Compeau Christopher A., 1995a, 1995b) provide users with a basic understanding of the computer interface. However, integrative technologies are relatively new additions to the corporate digital transformation toolbox. In many cases, corporations are adopting new EIS for the first time. In other cases with existing EIS, when an organizations decides to upgrade its EIS, new

integrative system interfaces and processes may differ drastically from the old ones, with the result that the user is in the position of learning from scratch. In such a situation, the Super User has a dual role: the first is explaining to users the new system interfaces and functionalities and the second is teaching how the user job functions can be properly performed by the new system. The majority of the study participants in our sample indicated that they did not have much EIS experience prior to its implementation with Super User involvement and support. Although the users did not have much immediate experience with integrative technologies prior to Super User involvement, they indicated that after experiencing Super User support, they were convinced that the new EIS would be useful to their job and would increase their productivity. They firmly believed that the Super User would teach and help them to become better in their jobs, more productive in their functions, and improve their performance. The study results supported this hypothesis of the crucial role of a Super User as a strong and effective support for supporting individual user characteristics as they improved to meet performance expectations.

Functional Area Expertise

Results showed that many users had prior Functional area expertise. The higher user functional area expertise is, the easier it is for them to understand the functional area data flow and to focus on understanding the relevant system functionalities and to improve process efficiencies (Short, 1976). This hypothesis was supported and showed that Super User support of users with prior functional area expertise individual characteristics led to a higher user performance expectancy.

Familiarity with Others

The familiarity with others hypothesis was not supported in the results' analysis. Familiarity with others as a characteristic of group dynamics (Brown et al., 2010; Dennis, 1988; Dennis et al., 2001) and decision-making processes appeared not to be a significant and weighty variable of performance expectancy. Although the participants claimed to know their co-workers well, their Super User supported familiarity with others did not reflect improved performance expectancy. The study inferred that the users of integrative technologies still rely heavily on individual characteristics and Super User support, and do not see themselves as a part of a group decision-making process using collaborative technologies. Knowing the co-workers well, having close interpersonal working relationships with them as a part of the everyday day-to-day job and as a part of a collaborative decision-making process using integrative technologies was not considered by the participants as a factor contributing to their performance expectancy. Although group characteristics are an important factor in telecommunications and other types of collaborative technologies, this research concludes that the collaborative side of integrative technologies is not yet understood well by users. This is the first study to arrive at this conclusion. As research in this area develops further and practitioners implement my research findings in their work, I predict that the dynamics in group decision-making using integrative technologies will change as well.

7.1.2 Super User as a Human Facilitating Condition Resource

Resource Facilitating Conditions

Resource Facilitating Conditions are a situational factor, and an important aspect of the integrative system environment. It traditionally refers to money, infrastructure and other organizational assets that incentivise users on technology adoption, use or any other organizational initiative. Resource Facilitating Conditions in this research are represented by the human factor – the Super User. Our study indicates that a Super User should not be viewed as a temporary event or a near random choice, but should be perceived and treated as an incented, organizational asset, that needs to be cultivated and valued. The Value that a Super User brings to the organization, especially during new systems implementations, can make or break the success of the EIS implementation process. Leaving Super User support with unclearly defined values and boundaries results in a learning process that is undefined, chaotic and ineffective. On the other hand, treating a Super User as an organizational asset, incented and resourced for user encouragement and support, sets up clearly defined values and boundaries on what needs to be done, and why, how and when. In addition to this, treating Super Users on a personal level with ad hoc assignments and unclear value, can lead users to feel lost, helpless and unmotivated. As a result, the users could feel that the organization does not support and encourage their learning during the transition, they are left to understand the concepts and resolve issues on their own, and that they don't have anyone to answer questions and share their frustrations. As a result, with implementation teams who are usually extremely busy with tight implementation deadlines, users approaching a Super User co-worker, who does not have a clear responsibility mandated by the organization might feel daunting and intimidating.

Prior studies have demonstrated that if resource facilitating conditions are contributing to the perceptions that such resources are available to support system use, perceptions of facilitating conditions will increase as well (S. Taylor & Todd, 1995). This study presented a Super User as a Resource Facilitating Condition provided by the organization, an asset shared with users by the employer during the systems implementation process, with clearly defined values and responsibilities. Such Super User support defined as a Resource Facilitating Condition in regard to the Super User's ability to support ease of access to the collaborative features of EIS will positively influence users' perceptions of Facilitating Conditions. The study results supported this hypothesis.

7.1.3 Impact of Super User Support on User Satisfaction

Performance Expectancy

Performance Expectancy is the "degree to which a user believes that using the system will help him/her to attain gains in job performance" (Venkatesh et al., 2003b). Performance Expectancy in this study is represented by the Technology Characteristics of Social Presence and Immediacy. These represent individual characteristics such as EIS experience and Functional Area expertise, and Group characteristics such as Familiarity with others. The Group characteristics hypothesis was not supported by this study and the individual Performance Expectancy focuses on Social Presence, Immediacy, EIS experience and Functional Area Expertise. A positive relationship of these constructs with Performance Expectancy was supported in this research.

The hypothesis that Performance Expectancy positively influences Confirmation is also supported by the research results.

Facilitating Condition Expectations

Facilitating Conditions represent organizational situational characteristics. Organizational situational characteristics could be incentives, organizational culture, the degree to which technology use is encouraged (Bajwa, 2008) or any other organizational facilitation that provides support to employees. Users define whether the organizational facilitating conditions in the form of Super User support is effective, sufficient and suitable to obtain necessary knowledge and adequate support.

This research focuses on user satisfaction based on confirmation of user Facilitation Conditions Expectations. The better user perceptions were of Facilitating Conditions Expectancy, the higher the chances were of Facilitating Conditions confirmation.

The hypothesis that Super User related Facilitating Conditions expectations positively influence Confirmation is supported by the study results.

Perceived Performance

Perceived Performance Expectancy represents how users perceived their Performance improvements with the support of a Super User and that this support was reasonable and worth using. The Hypothesis of a positive relationship between Perceived Performance and Confirmation is supported by the study results.

Perceived Facilitating Conditions

Perceived Facilitating Conditions represent how users perceived facilitating conditions through Super User support as reasonable, worked for them and was worth using. The Hypothesis of positive relationships between Perceived Facilitating Conditions and Confirmation is supported by the study results.

Confirmation

Confirmation was determined by users who participated in the survey, based on their experience with overall Super User support. Users evaluated the efficiency and overall, EIS expectations as a factor of Super User support. The Hypothesis of positive relationship between Confirmation and User Satisfaction is supported by this research.

7.1.4 Effect of Demographics

Analysis based on demographics through control variables can provide valuable insights into the research. The significant impact of certain demographic values on research constructs indicates that there is a possible relationship between certain demographics and some of the research constructs and that those relationships should be introduced for study in future models. The demographics analysis showed that there was a small to medium effect of several demographic variables on the research constructs. For example, user gender showed a significant effect on user satisfaction, showing that females are more satisfied with Super User support during EIS implementations than males. Prior Super User experience, non-management position and large organizational size also have an effect on facilitating conditions. The system type (CRM vs EHR vs SCM) might also have an impact

on performance expectancy. It is therefore suggested that these demographic variables should be included in future research as control variables.

7.1.5 Explanatory Study

The results of the explanatory (qualitative) study provided an expanded view of Super User related user expectations, activities, and satisfaction/dissatisfaction, not only from a focused perspective of Super User- related support providing an augmented view of EIS systems as a collaborative medium, but also from a perspective of Super User related support for EIS implementation in general.

One of the emergent themes in the analysis was collaboration. Collaboration was not specifically referred to as a Super User characteristic in the prior literature. Although several papers mentioned it as collective learning or collective information sharing, collaboration involves much more and goes beyond just information sharing or collective learning. Collaboration as a Super User characteristic was mentioned multiple times in conjunction with Teamwork, Strategies, Technical, Effective, Social presence, and Advocating. Some users mentioned that collaborative activities facilitated by the Super User were bringing them together. The users mentioned “togetherness”, “comradery” etc. as satisfactory factors in Super User facilitated support. Collaboration strategies to increase communication efficiency and process flow were important as well as advocating for user needs and concerns. Social presence through “team chat that made it much easier to see each others questions as well as quickly get our own questions answered” also helped users to get answers about what could or could not be done, thus managing their expectations proactively.

Collaboration as a Super User characteristic was mentioned multiple times, in conjunction with Teamwork, Strategies, Technical, Effective, Social presence, and Advocating.

Another interesting observation regarded expectations management. This resulted from the fact that management of user expectations and End User Development (EUD) before implementations began was shown to be important. User feedback showed that users might have unrealistically high or low expectations of Super Users, as their one and only complete source of information:

> #14 "I had the expectation that the super user was going to have all the answers and that was not at all the case."
>
> #40 "I expect the super users to be well-versed and be able to explain any issues that would come from the new system implementation."
>
> 331 "I was kind of skeptical before the beginning of the process, so I had very low expectations. Therefore, the process was positive when it was done."

Collaboration in this case could also be a part of user expectations management. It is impossible that a Super User would be able to answer all user questions, in particular the technical ones. Super Users are not experts in a new system, they are colleagues with good functional area knowledge and training skills who received EIS training earlier than other users. It would be impossible to expect from such a Super User that the expert system knowledge could be learned in such a short period of time. From this perspective, collaborative skills of Super Users must ensure that they obtain answers from technical experts that are timely to the areas where they are unsure about or not very familiar with. Cultivating user feel of social presence and facilitating use of EIS collaborative capabilities,

a Super User also provides users with additional tools to utilize in their queries. Managing user expectations also means proactively developing user understanding of the process, and providing all the necessary tools for support, including collaborative tools and technologies, in addition to ensuring the availability and readiness for any extra support when and if needed.

Although familiarity with other users was not supported by the study, familiarity with Super User as a resource facilitating condition led to a significant increase in user satisfaction with the implementation process:

> #7 "The super user was knowledgeable and helpful and super user was always available when needed for questions. The super user was knowledgeable, and I worked with them before on other similar projects which made it comfortable."
>
> #19 "any time I had a question the super user was available to help. I knew the super user before implementing the product, so I felt very comfortable with asking the super user when I had questions."

The final observation is that little attention had been paid to the Super User development process as a whole, all the way from recruitment, selection and fitting to Super User readiness and preparedness. A Super User's lack of readiness and preparedness for every EIS implementation stage was identified as a major source of user dissatisfaction. In view of a Super User as a resource facilitating condition, some users experienced dissatisfaction with Super User selection and readiness:

> #65 "They could have been better at explaining the system and showing the staff how to use it in a better environment. None was prepared… it seemed as if the so-called super users were not that at all or that they just didn't care".

> #328 "The so-called Super User was somebody who was forced into the position. As a result, minimal effort was taken on her part to become familiar with the new system".

Super Users as a resource facilitating condition clearly showed the organizational needs for improvement in their Super User Recruitment, Selection and Development processes.

Under the guidance of a Super User, users are working hard to learn vast amounts of information and new user interfaces. They are also striving to optimize their work through the advanced interface and system functionalities. When the goal is achieved and the Super User can facilitate the process in a way that the sense of achievement and improvement is created, users feel rewarded for all the hard work that has been completed satisfactorily.

7.2 Contribution to Theory

First, this research contributes to the literature by uncovering the multifaceted and critical role of Super User in a new perspective as a facilitator of user perception formation of integrative technologies as a strong social presence medium that can increase user effectiveness. This research is a first study in integrative systems implementations that suggests expanding the view of EIS not only as an integrative platform, but as a social presence medium with collaborative capabilities. It uncovers this new dimension of EIS integrative technology as an effective collaborative medium.

Second, this study consolidates and quantifies the Super User characteristics and behaviors mentioned in prior studies. The research follows Prisma guidelines while creating a repository that outlines the most widely referenced Super User characteristics and selection

criteria mentioned to date in the literature. Super User characteristics are referenced as the most used support for integrative skills and the most used standalone characteristics.

Third, this research creates a new dimension of Super User effectiveness, emphasizing the importance of Super User ability to collaborate with different teams involved in the organizational EIS implementation process, by facilitating user collaboration, user learning and utilization of EIS collaborative capabilities. This study also explores the effects of user and organizational demographics on user performance, organizational facilitating conditions, confirmation and user satisfaction in EIS implementation as a part of organizational digital transformation undertakings.

Fourth, this study presents a Super User as an organizational resource that forms a part of organizational facilitating conditions. Availability of this resource, by utilizing proper recruitment, selection, development and readiness preparation are organizational responsibilities that constitute a part of any overall organizational implementation efforts. The development and implementation of Super Users thus become a part of organizational strategic efforts towards the achievement of user satisfaction and improvement of EIS implementation success rates.

Last and not least, the study findings can be generalized and applied not only to EIS implementation process, but any other processes involving Super User facilitation. Super User facilitation can be explored from many different angles from change management to the strategic resource perspectives.

Overall, the major theoretical contribution of this study comes from applying social psychology theories of collaborative technologies in the integrative technologies space. Integrative technologies until now have been seen and applied mainly from a technical point of view. This research can be seen as describing a social presence dimension facilitated by a Super User in an integrative technology space. This development not only enhances user effectiveness through increased performance, but it will also facilitate faster system learning and problem solving and creating a better organizational environment through engagement and collaboration.

7.3 Contributions to Practice

One of the practical contributions of this research is that it emphasizes inconsistencies in definitions of "Super User", "Key User", "Power User" and "Expert User", by creating boundaries and clarifying the "Super User" role. Presently, these terms are used interchangeably in the literature, creating confusion in recommending suitable adoption strategies. My research cautions that practical contributions from previous research might not be relevant for a specific organizational position since the terms are cross referenced and combined, with no clear definitions and boundaries. This research formulates the role of Super User and distinguishes it from other terms, providing a clearer view for management. Further research would be helpful in creating a proper typology that will emerge, based on the role of the skills development process.

Another practical contribution is that the research revealed the importance of facilitating users in developing their perceptions of EIS as rich collaborative mediums. Super Users must be able to facilitate and guide users in forming those perceptions as this will lead to

increased performance and satisfaction of the users. Managers in this case will be able to consider and include this characteristic in Super User selection criteria and create proper Super User job position descriptions before entering an organizational EIS implementation process.

This research also emphasizes the importance of Super User facilitation and support in helping users to perceive integrative technologies as more social. This perception would help to connect organizational users and enhance system learning through collaboration, both individually and in groups during and after an EIS implementation process. Managers can emphasise to the users the collaborative capabilities of the new EIS system before its implementation to form user expectations, ease system learning and improve user performance.

Management should also consider providing support and encouragement for users to use the collaborative features of EIS rather than employing other applications. By consolidating communication and collaboration through the same system, users will learn the system faster and better, will be able to have more effective and efficient communication, enhanced cross-functional collaboration, and faster problem resolution; as a result, user performance will increase.

Overall, the study underlines the importance of the Super User role as an organizational change agent, which needs to be recognized by practitioners, in terms of facilitating conditions that will lead to a successful EIS implementation. To do so, organizations should

increase efforts in refining Super User selection criteria, start the selection process early and provide necessary support for targeted Super User development.

7.4 Limitations

The literature review in Chapter 2 was based on all the terms sometimes used to describe the key user, power user, expert user and super user job position. The reason for adopting this approach was that neither the literature nor practice has a clear separation between those terms. As the theory does not provide a clear separation, practice also intertwines the concepts. Clarity was therefore needed in the common definitions to avoid undefined concepts and proliferation of terms. As a result, this research carried all these terms under the one definition of Super User. In the future, better clarity of terms is needed in the definition of Super User.

Another limitation was the data gathering process. User responses were collected after the EIS implementations were completed and the users had to recall the relevant events from their memories. This could affect the recollection of their perceptions and skew their expectations. For better understanding, future studies should collect the data twice, both before the and after the EIS implementation being studied.

The data were collected cross-sectionally. A longitudinal study would be more accurate since participant responses could be collected through the different stages of the EIS implementation process.

Data were collected from all the users who experienced an EIS implementation at least once during their employment. Thus, participants weren't limited in their prior experiences

and some of the participants had been involved in other implementations as key users or super users as well. Also, management and non management users were treated equally in this study.

Finally, organizational size, industry, business processes, type of implemented EIS and participant gender were not accounted for and treated equally in this study.

7.5 Future Studies

This research focused on one dimension of Super User support, as an effective means to perceive new or upgraded EIS as a social presence medium for efficient user collaboration and business process coordination. A suggestion for future study is to develop a scale for Super User effectiveness that would combine previous literature findings on Super User effectiveness with the findings of the present study.

Although EIS implementation is a lengthy process and Super Users can guide users through all the steps of the process, only Super User-supported EIS integrative technology user satisfaction was examined in this study. A recommendation for future research is to examine Super User involvement throughout all the stages of system implementation to give a better understanding of Super User effectiveness at each stage of the EIS implementation process.

Future research could consider refining participant involvement to study only managerial or non managerial users. This could provide insight into how managers vs non-managers tend to perceive the EIS implementation process.

Another avenue for future research is to develop comparative studies of the EIS implementation in different industries, different organizational processes and with different EIS types. All these factors were shown in this study to have a potentially significant impact on refining the study results and conclusions.

Future studies could also consider research on collaborative futures of technologies in other information system processes that include Super User facilitation. The corporate world has become increasingly techno-driven, and users must keep up with the increased complexity of their jobs. Super User facilitation on the collaborative capabilities of their information systems can significantly alleviate the pressure to perform well, so improving user performance should be explored more in depth in the future.

All those suggestions for future studies are outlined in the "limitations" subsection above and indicate a fruitful potential for future research explorations and studies.

7.6 Conclusion

EIS integrative capabilities provide superior advantages to organizations by integrating all corporate data on one platform to ensure the smooth data entry, flow, information processing and analysis. Collaborative capabilities of integrative systems allow users to communicate, learn and use the system efficiently, but collaborative capabilities of integrative systems are yet to be explored in detail.

This study provided a singular view of EIS implementation and user satisfaction research. It focused on collaborative capabilities of integrative technologies as a source for user satisfaction during and after EIS implementations. It showed that a Super User plays a

critical role in facilitating augmentation of user perception of EIS not only as integrative, but also as a collaborative system, thus providing users with additional tools that could potentially increase their performance.

From the Super User related research perspective, this study presented the Super User as a resource facilitating condition provided by organizations in order to provide knowledge and continuous support to users. Super User availability, accessibility and expertise can allow seamless EIS implementation process flow related to information acquisition and application for increased performance. Research into EIS social presence and immediacy capabilities driven by Super User involvement will help users to achieve higher satisfaction from the EIS implementation process and subsequent EIS use.

Unclear boundaries between various user definitions such as super-user, key-user and power-user tend to create confusion in practical applications and uncertainties in the theoretical findings. This research suggests the importance of creating an appropriate taxonomy of Super User definitions and exploring further the development and implementation of Super User effectiveness characteristics.

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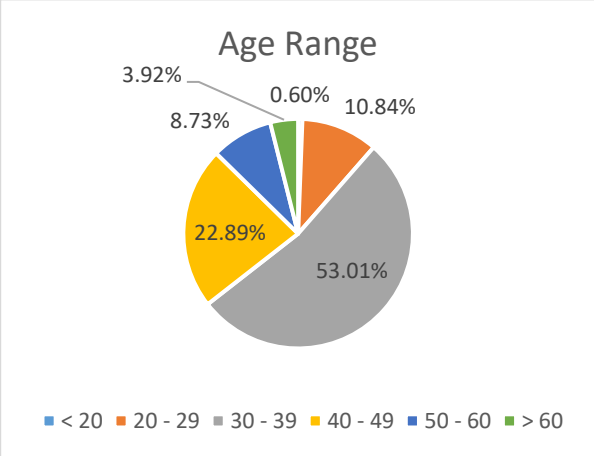
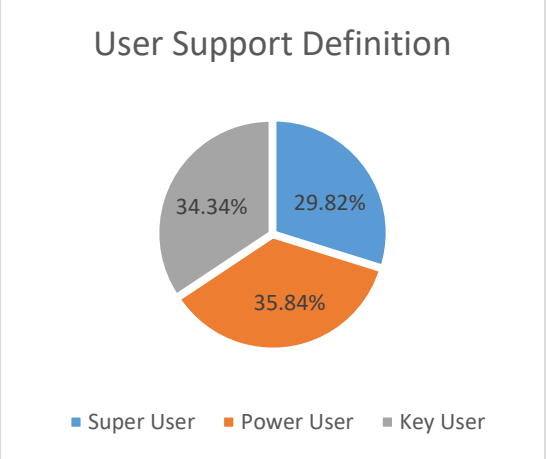
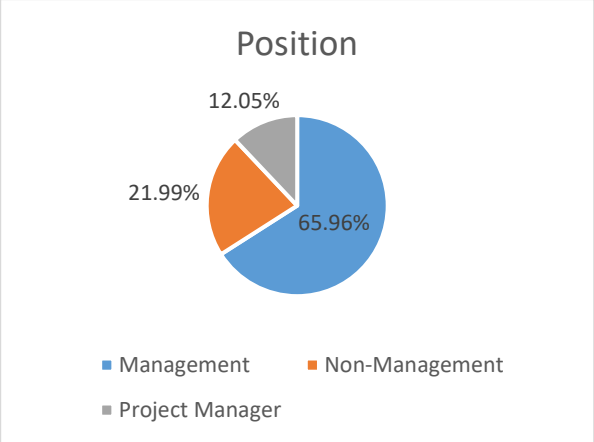
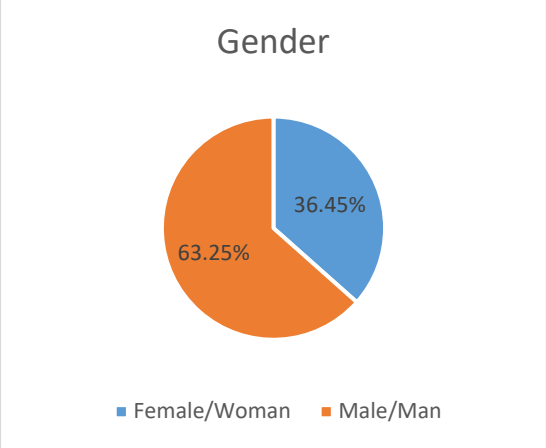
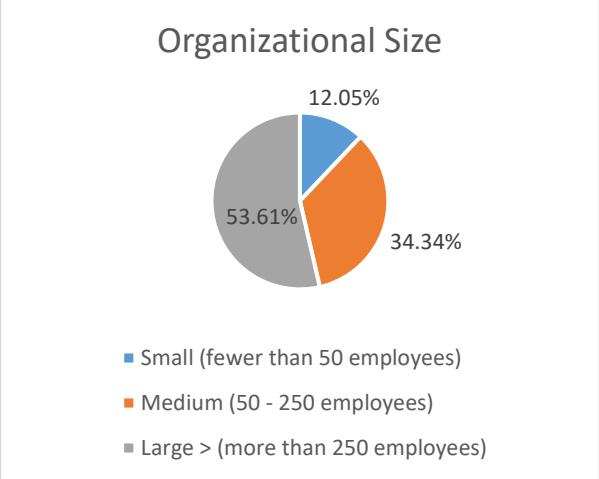
APPENDIX A – Demographic Data

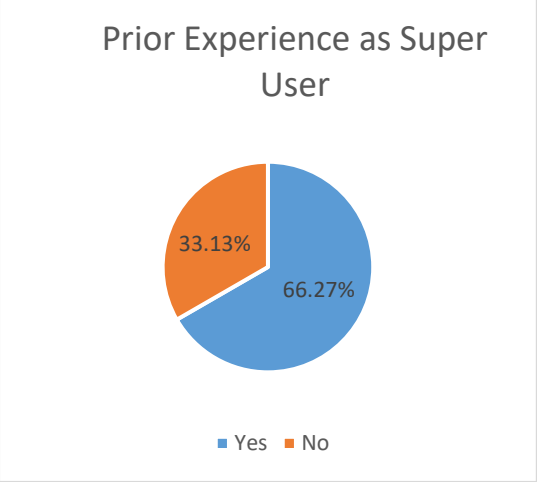


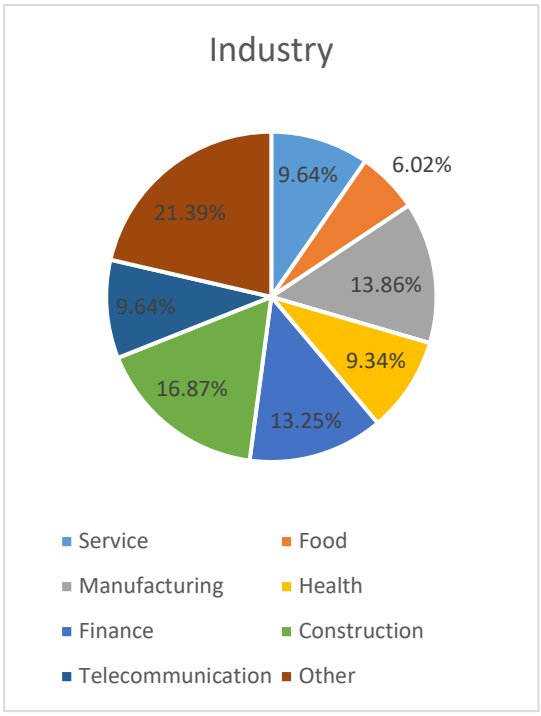


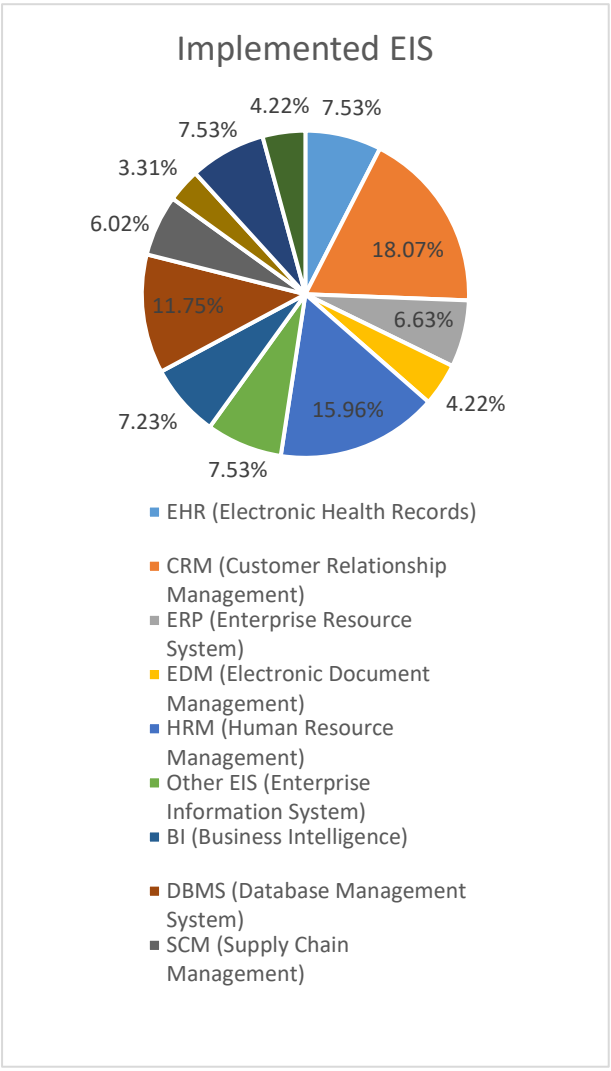


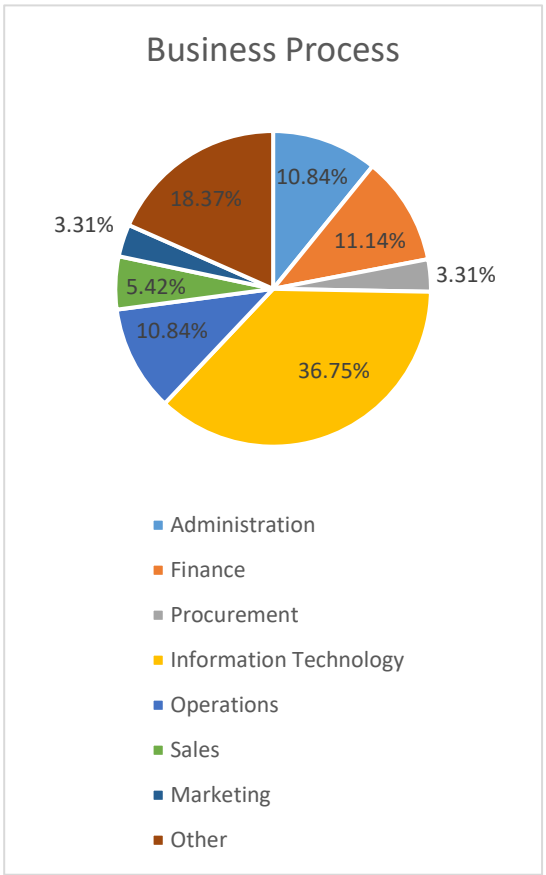


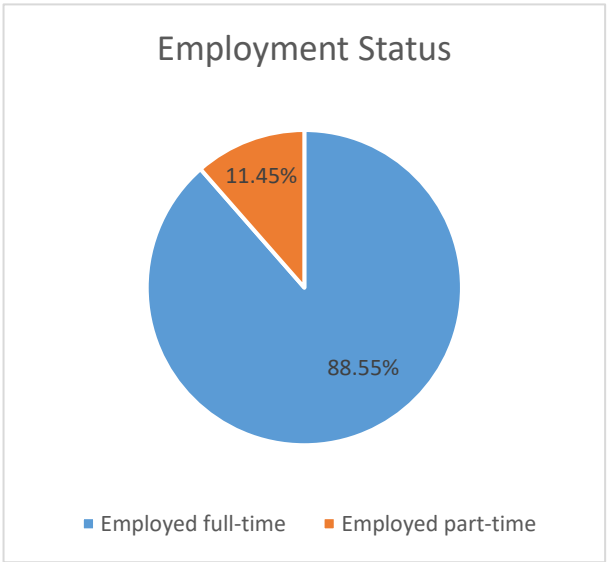


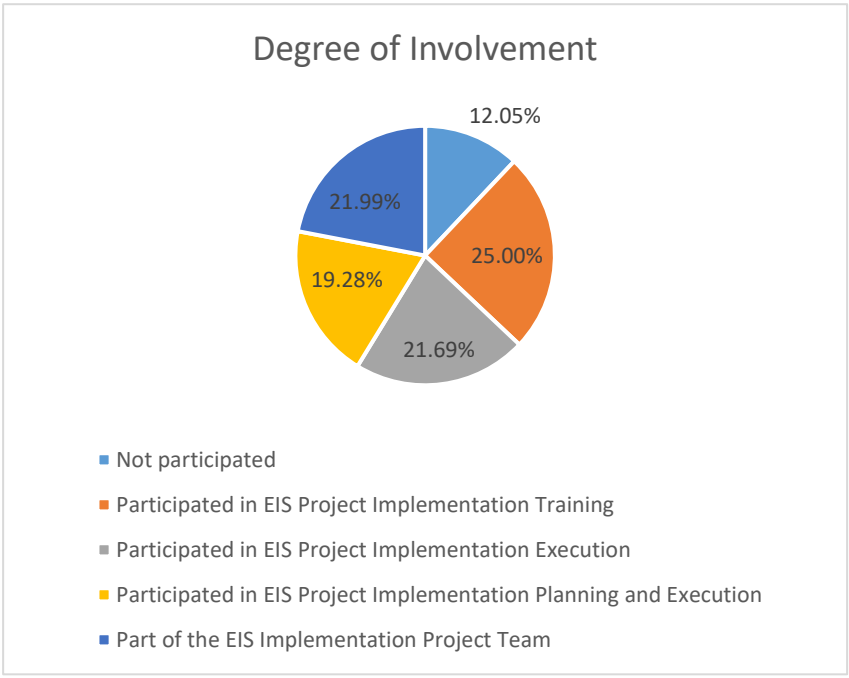


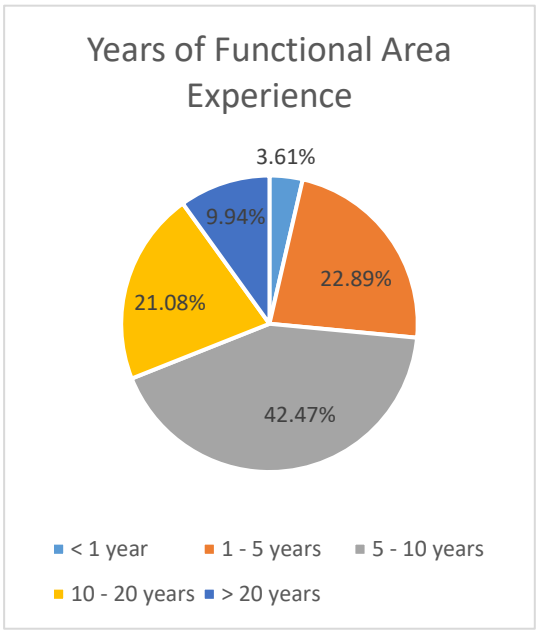

Industry
9.64%
6.02%
13.86%
9.34%
13.25%
16.87%
9.64%
21.39%
Service
Food
Manufacturing
Health
Finance
Construction
Telecommunication
Other


Implemented EIS
4.22%
7.53%
7.53%
3.31%
6.02%
18.07%
11.75%
6.63%
4.22%
7.23%
15.96%
7.53%
EHR (Electronic Health Records)
CRM (Customer Relationship Management)
ERP (Enterprise Resource System)
EDM (Electronic Document Management)
HRM (Human Resource Management)
Other EIS (Enterprise Information System)
BI (Business Intelligence)
DBMS (Database Management System)
SCM (Supply Chain Management)


Business Process
10.84%
18.37%
3.31%
11.14%
3.31%
5.42%
10.84%
36.75%
Administration
Finance
Procurement
Information Technology
Operations
Sales
Marketing
Other


Employment Status
11.45%
88.55%
Employed full-time
Employed part-time


Degree of Involvement
12.05%
25.00%
21.69%
19.28%
21.99%
Not participated
Participated in EIS Project Implementation Training
Participated in EIS Project Implementation Execution
Participated in EIS Project Implementation Planning and Execution
Part of the EIS Implementation Project Team


Years of Functional Area Experience
3.61%
22.89%
42.47%
21.08%
9.94%
< 1 year
1 - 5 years
5 - 10 years
10 - 20 years
> 20 years

APPENDIX B – Demographic Variables Analysis

Control Variable	Endogenous Construct	Path Coefficient	Sample mean	Standard deviation	T statistics	P values	Significance
EIS System	system_EAM -> conf	0.409	0.393	0.194	2.111	0.035	p<0.05
	system_EAM -> fc	0.187	0.191	0.237	0.789	0.430	n.s.
	system_EAM -> pe	-0.244	-0.247	0.162	1.512	0.131	n.s.
	system_EAM -> us	-0.079	-0.080	0.138	0.571	0.568	n.s.
	system_EHR -> conf	-0.038	-0.044	0.085	0.445	0.656	n.s.
	system_EHR -> fc	0.100	0.099	0.103	0.967	0.334	n.s.
	system_EHR -> pe	0.153	0.151	0.075	2.040	0.041	p<0.05
	system_EHR -> us	0.087	0.085	0.088	0.979	0.328	n.s.
	system_CRM -> conf	-0.023	-0.016	0.139	0.166	0.868	n.s.
	system_CRM -> fc	-0.357	-0.356	0.218	1.639	0.101	n.s.
	system_CRM -> pe	-0.352	-0.342	0.162	2.173	0.030	p<0.05
	system_CRM -> us	-0.396	-0.391	0.167	2.376	0.018	p<0.05
	system_SCM -> conf	-0.021	-0.020	0.170	0.122	0.903	n.s.
	system_SCM -> fc	0.119	0.126	0.316	0.376	0.707	n.s.
	system_SCM -> pe	0.329	0.323	0.149	2.203	0.028	p<0.05
	system_SCM -> us	0.121	0.125	0.240	0.503	0.615	n.s.
	system_otherEIS -> conf	-0.340	-0.340	0.149	2.280	0.023	p<0.05
	system_otherEIS -> fc	-0.119	-0.126	0.211	0.566	0.572	n.s.
	system_otherEIS -> pe	-0.228	-0.231	0.219	1.042	0.297	n.s.
	system_otherEIS -> us	-0.072	-0.079	0.186	0.388	0.698	n.s.
Gender	gender -> conf	0.043	0.038	0.077	0.553	0.580	n.s.
	gender -> fc	0.108	0.107	0.120	0.903	0.367	n.s.
	gender -> pe	-0.037	-0.035	0.085	0.434	0.664	n.s.
	gender -> us	0.162	0.164	0.079	2.046	0.041	p<0.05
Organization size	org_large -> conf	0.033	0.028	0.071	0.467	0.640	n.s.
	org_large -> fc	0.262	0.262	0.099	2.651	0.008	p<0.01
	org_large -> pe	-0.033	-0.032	0.070	0.467	0.641	n.s.
	org_large -> us	0.129	0.129	0.073	1.765	0.078	n.s.
	org_small -> conf	-0.137	-0.138	0.138	0.994	0.320	n.s.
	org_small -> fc	-0.443	-0.438	0.194	2.286	0.022	p<0.05

	org_small -> pe	0.121	0.123	0.113	1.075	0.283	n.s.
	org_small -> us	-0.187	-0.192	0.163	1.146	0.252	n.s.
Industry	ind_food -> conf	-0.058	-0.056	0.161	0.358	0.720	n.s.
	ind_food -> fc	-0.667	-0.671	0.319	2.091	0.037	p<0.05
	ind_food -> pe	-0.258	-0.243	0.277	0.932	0.351	n.s.
	ind_food -> us	-0.034	-0.032	0.206	0.163	0.871	n.s.
	ind_fin -> conf	-0.013	-0.010	0.150	0.085	0.932	n.s.
	ind_fin -> fc	0.267	0.268	0.105	2.531	0.011	p<0.05
	ind_fin -> pe	0.156	0.156	0.097	1.620	0.105	n.s.
	ind_fin -> us	0.222	0.217	0.141	1.575	0.115	n.s.
Business Process	proc_procur -> conf	0.005	0.004	0.069	0.079	0.937	n.s.
	proc_procur -> fc	0.279	0.278	0.096	2.903	0.004	p<0.01
	proc_procur -> pe	0.116	0.113	0.064	1.807	0.071	n.s.
	proc_procur -> us	0.180	0.178	0.076	2.376	0.018	p<0.05
	proc_fin -> conf	0.151	0.156	0.164	0.921	0.357	n.s.
	proc_fin -> fc	-0.543	-0.548	0.276	1.967	0.049	p<0.05
	proc_fin -> pe	-0.404	-0.400	0.164	2.459	0.014	p<0.05
	proc_fin -> us	-0.446	-0.449	0.244	1.827	0.068	n.s.
	proc_market -> conf	0.167	0.171	0.136	1.226	0.22	n.s.
	proc_market -> fc	0.463	0.466	0.19	2.436	0.015	p<0.05
	proc_market -> pe	0.311	0.297	0.246	1.266	0.205	n.s.
	proc_market -> us	0.063	0.064	0.138	0.46	0.645	n.s.
	proc_other -> conf	-0.09	-0.096	0.102	0.877	0.381	n.s.
	proc_other -> fc	-0.448	-0.45	0.154	2.917	0.004	p<0.01
	proc_other -> pe	-0.253	-0.251	0.098	2.575	0.01	p<0.05
	proc_other -> us	-0.04	-0.037	0.115	0.346	0.729	n.s.
Position	pos_PM -> conf	-0.203	-0.201	0.117	1.742	0.082	n.s.
	pos_PM -> fc	0.303	0.304	0.125	2.430	0.015	p<0.05
	pos_PM -> pe	0.100	0.099	0.087	1.148	0.251	n.s.
	pos_PM -> us	0.207	0.204	0.120	1.725	0.085	n.s.
	pos_nmanag -> conf	-0.064	-0.058	0.096	0.669	0.503	n.s.
	pos_nmanag -> fc	-0.445	-0.444	0.147	3.036	0.002	p<0.01
	pos_nmanag -> pe	-0.158	-0.159	0.119	1.320	0.187	n.s.
	pos_nmanag -> us	-0.336	-0.338	0.105	3.198	0.001	p<0.01
Involvement Stages	inv_pmteam -> conf	0.027	0.030	0.068	0.402	0.688	n.s.
	inv_pmteam -> fc	0.308	0.307	0.106	2.907	0.004	p<0.01
	inv_pmteam -> pe	0.009	0.010	0.066	0.140	0.888	n.s.

	inv_pmteam -> us	0.061	0.061	0.084	0.724	0.469	n.s.
	inv_plan_exec -> conf	0.140	0.128	0.083	1.696	0.090	n.s.
	inv_plan_exec -> fc	0.355	0.357	0.131	2.712	0.007	p<0.01
	inv_plan_exec -> pe	0.119	0.117	0.079	1.505	0.132	n.s.
	inv_plan_exec -> us	0.153	0.153	0.079	1.950	0.051	n.s.
	inv_np -> conf	-0.007	-0.006	0.138	0.051	0.959	n.s.
	inv_np -> fc	-0.649	-0.650	0.232	2.801	0.005	p<0.01
	inv_np -> pe	-0.370	-0.369	0.159	2.326	0.020	p<0.05
	inv_np -> us	-0.202	-0.202	0.140	1.438	0.151	n.s.
Prior Super User Experience	prior_su -> conf	-0.112	-0.106	0.088	1.271	0.204	n.s.
	prior_su -> fc	-0.369	-0.370	0.134	2.751	0.006	p<0.01
	prior_su -> pe	-0.132	-0.133	0.109	1.211	0.226	n.s.
	prior_su -> us	-0.116	-0.118	0.099	1.171	0.241	n.s.